Advant® OCS
with Master software

Functional Units Part 9
DRICONE

User's Guide

3BSE 013 947R0001

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Chapter 1 Introduction

1.1 Before You Begin

The functional unit DRICONE is one of several functional units available in the Advant OCS process control systems. It is a complete function to integrate engineered Drive , including functions for operator interface and event handling. This manual describes the functional unit DRICONE in detail, its functions, how to use it in applications, how to do the configuration and how to operate it. The purpose is to provide all the information needed for the people who are expected to handle it (control designers, commissioning engineers, operators, service engineers and so on).

1.2 Equipment Requirements

The functional unit DRICONE requires AdvaCommand, and an Advant Controller 400 with the software library module for connection to operator stations (QC01-OPF11, QC02-OPF21 or QC07-OPF41) installed. The configuration is done with an Engineering Station in the Advant OCS Series.

The software versions must be as follow:

- QC01-BAS11*9.0, QC01-OPF11*9.0 or later
- QC02-BAS21*9.0, QC02-OPF21*9.0 or later
- QC07-BAS11*1.0, QC07-OPF41*1.0 or later
- AdvaCommand version 1.8-1 or later.
- AdvaCommand version 1.7 for Windows NT or later.

The DRICONE requires Advant Fieldbus AF 100, Communication Interface CI810 and Modulebus Optical port TB811or Modulebus Optical port TB810 connected to optical branching unit NDBU-85.

The Drives which communicate with the DRICONE functional unit are called engineered drives in this user's guide. The specific drive name will be used when there are exceptions between different engineered drives. The following drives are considered to be engineered drives.

- ACS 600 with system application (MultiDrive ACA)
- ACS 600 Programmable drive which is configured to respond as an engineered drive
- DCS 600 MultiDrive using AMC-DC board
- DCS 500B using CON2 board
- ACS 600 CraneDrive (ACC) which is configured to respond as an engineered drive.

The *Functional Units Part 8, DRICONS User's Guide.*describes drives which are called standard drives. The following drives are considered to be standard drives.

- ACS 600 with standard application (SingleDrive ACS)
- ACS 600 Programmable drive which is configured to respond as an standard drive
- ACS 600 MotionControl (ACP)
- ACS 600 Pump&FanDrive (ACF)
- ACS 600 CraneDrive (ACC) which is configured to respond as a standard drive.

1.3 How to Use This Book

This book is organized into chapters and sections as shown in Figure 1-1.

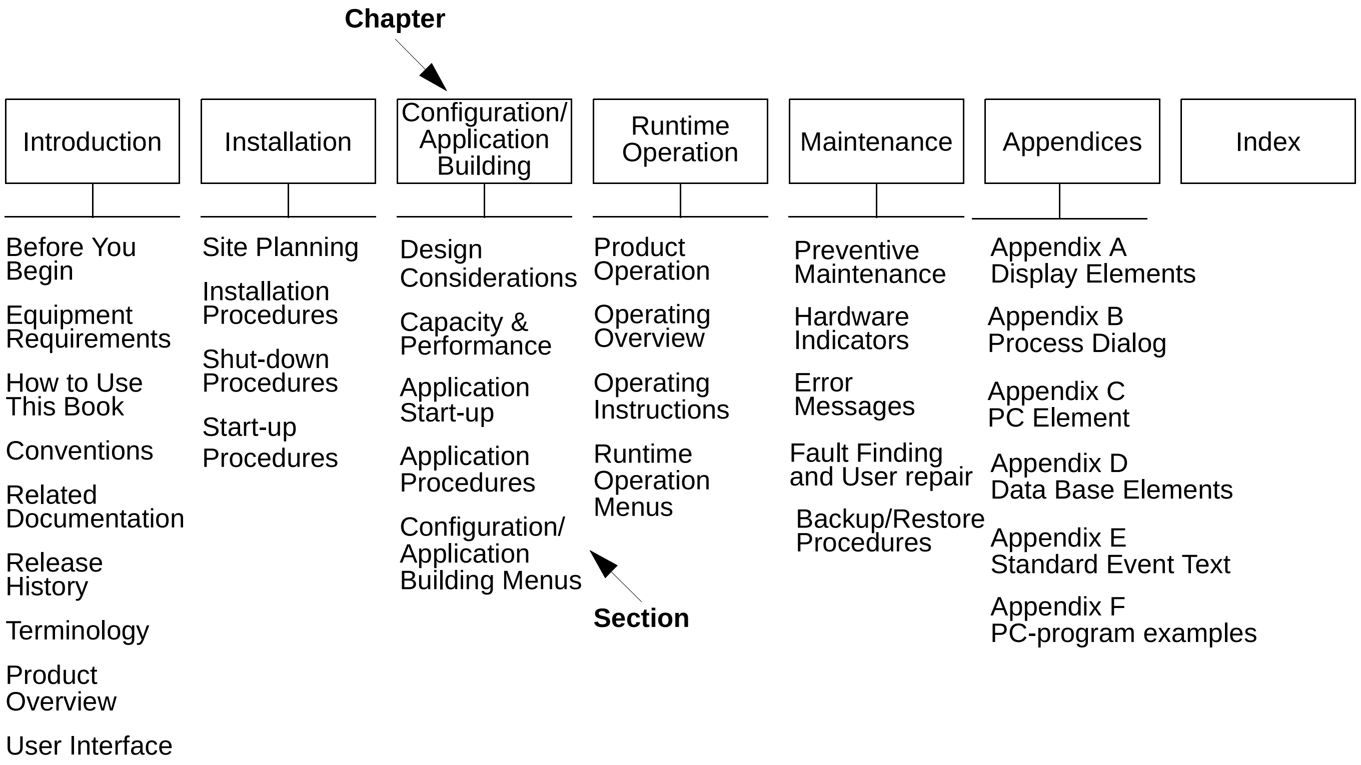


Figure 1-1. Organization of Manual

Chapter 1, Introduction

(this chapter) provides introductory and background information.This information includes:

- Guidelines how you can find information in the manual.
- The relation to other documents related to the operation of the DRICONE.
- A product and functional overview that give you an idea of what the DRICONE can do and how it works.

Chapter 2, Installation

guides the specific activities for a DRICONE installation:

- Hardware installation needed for connecting Drives to the control system.
- Installation of presentation and dialogs for AdvaCommand into Advant Station 500 Series operator stations.

Chapter 3, Configuration/Application Building

will give you the information needed to obtain the desired function. The main information is structured as follow:

- Design considerations and guidelines are given.
- Capacity and performance.

Chapter 4, Runtime Operation

discusses the different operating modes of the DRICONE.

Chapter 5, Maintenance

focuses on fault finding.

Appendices

Different information which does not fit elsewhere in this manual structure are included. Examples are:

- Description of Appendix A, Display Elements
- Description of Appendix B, Process Dialog
- Description of Appendix C, PC Elements
- Description of Appendix D, Data Base Elements
- Description of Appendix F, PC-program example.

1.4 Conventions

The following conventions are used throughout this manual for the presentation of material:

- The words in proper names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- The names of keyboard keys are boldfaced.
  - Initial capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, the **Return** key or **<Return>**.
  - Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
  - In descriptions, the word “key” is used in conjunction with its name. For example, pressing the **Return** key initiates the process.
  - In tables and procedures, angle brackets replace the word “key.” For example, press **<Return>**.
- The names of push and toggle buttons are boldfaced.
  - Initial capital letters are used for the name of a push or toggle button labeled on the display. For example, the **OK** button.
  - In descriptions, tables and procedures, the word “button” is used in conjunction with its name. For example, pressing the **OK** button initiates the process.
- System prompts/messages are shown in the Courier font, and user responses/input are in the boldfaced Courier font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be 0-30.
  ```

  In a tutorial, you may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure:

  ```
  TIC132
  ```

- The term “Data Set” can mean different things, in this context either the communication tables in the Drive to exchange data with other units or the mechanism in the Controller to exchange data between different PC-programs which are located in different controller nodes. The following convention is used, in order to avoid confusion: When the term “Drive Data Set” is written, it refers to the tables in the Drive and “Data Set” refers to the mechanism in the controller to exchange data between different controller nodes.

1.5 Related Documentation

Table 1-1 lists all documentation related to DRICONE.

Table 1-1. Related Documentation

Category	Title	Description
Software	Functional Unit Part1 Summary and Common Properties	Describes common properties of the functional units
	Functional Units Part 8, DRICONS User's Guide.	Describes integration of standard drives concerning installation, application programming and operator interface.
	PC elements Advant Controller 400 Series Reference Manual	Describes all PC-elements for the Advant Controller 400 series.
	Data Base elements Advant Controller 400 Series Reference Manual	Describes all DB-elements for the Advant Controller 400 series.
	AdvaCommand Basic Functions User's Guide	These manuals contain general information regarding operation and configuration
	AMPL Configuration Advant Controller 400 Series	
	AMPL Application Building	
	Advant Station 500 Series Operator Station User's Guide	Short description about Advant Station 500 Series Operator Station
	AdvaBuild Display Builder User's Guide	Manual for creating displays in an Operator Station
	AdvaCommand Basic Functions, Users Guide Part 2(3).	Manual for trend and log configuration
	AdvaCommand Process Sectioning	Manual for sectioning alarms
	ACS 600 MultiDrive Installation Manual	Manual for installation ACS 600 with system application
	Programming Manual ACS 600 MultiDrive	Manual for controlling and programming ACS 600 with system application
	Software Description DCS 500B	Manual for controlling and programming DCS 500
	Software Description DCS 600 Multi Drive	Manual for controlling and programming DCS 600 MultiDrive
	FCB Type Circuits Drive Objects User's Manual	Describes the DRICONE type circuit, installation, usage and function
System	S800 I/O User's guide	Describes the S800 I/O contains information how to install and commission the system.
	Advant Fieldbus 100 User's Guide	Describes the equipment and contains information required to install and commission the system.

1.6 Release History

Table 1-2 lists the major milestones in the development of the Drive integration.

Table 1-2. Release History

Version	Description
1.0	This is the initial Drive integration release described in manual Functional Units Part 8 DRICONS.
1.1	This release supports engineered Drive integration described in manual Functional Units Part 9 DRICONE.

1.7 Terminology

The following is a list of terms associated with DRICONE that you should be familiar with.

Term	Description
AMC table	Application Motor Control. Data table located in the drive containing all needed parameters for the motor.
CDP	A Cyclic Data Packet is an AF 100 variable sized packet of data, used for cyclic exchange of dynamic data.
DDCS	Link for connection of Drive to Communication Interface of overriding control system. The data speed is 4 Mbit/s.
DDS	Drive Data Set. The Drive Data Set contains available data for AC 400 data exchange. The Drive Data Set is called Data Set in the Drive documentation.
Drive	A Drive is essentially a motor controller which can control the operating characteristics of a motor (on/off, speed control, torque control, and so on.).
FCI	The Fieldbus Communication Interface (FCI) contains the interface to the fieldbus (AF 100), ModuleBus interface and power regulators.
ModuleBus	Is an incremental, electrical or optical, bus for interconnection of I/O devices and Drives.

1.8 Product Overview

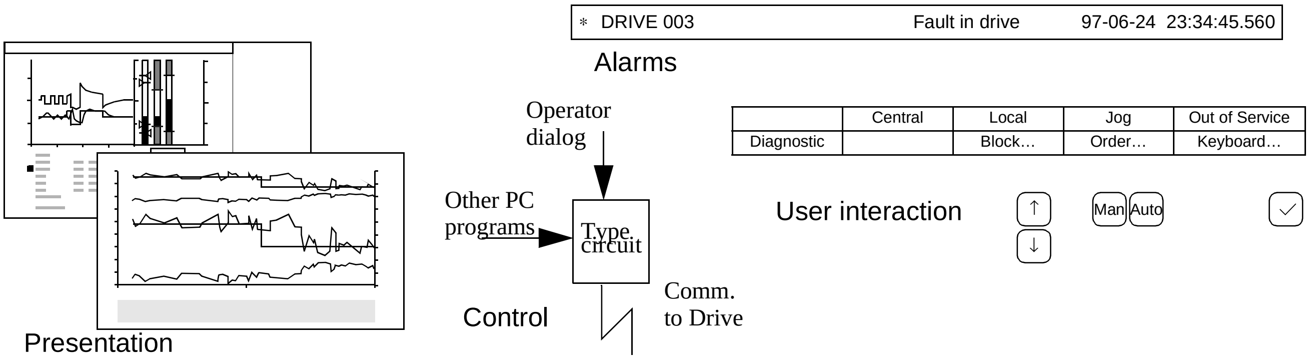
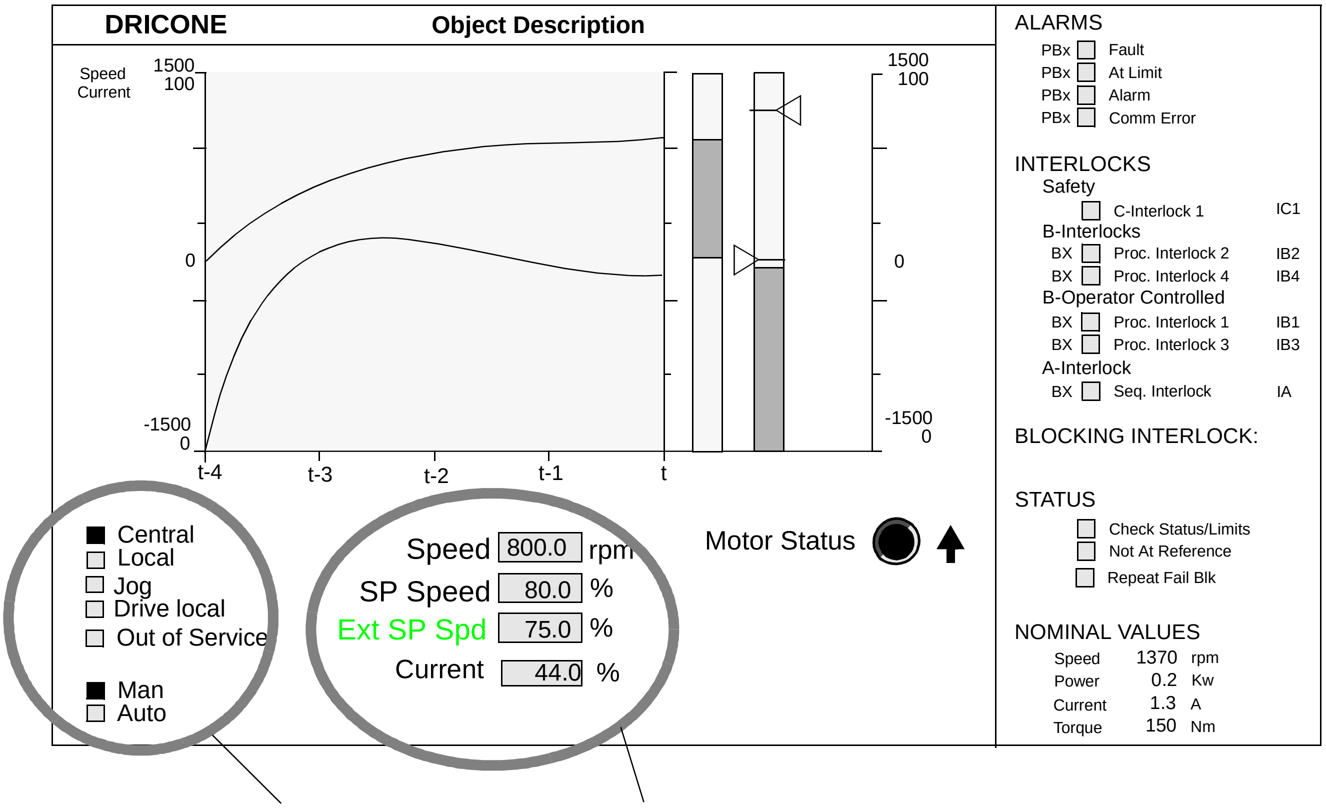


Figure 1-2. Basic Functions provided with the Functional Unit

The functional unit DRICONE handles data exchange with engineered Drives. It has a complete operator interface and event handling. The operator can control and supervise different motor characteristics such as speed, current and torque. The object display gives actual information about setpoints to the Drive and actual values. An example is given in Figure 1-3.



PBx ☐ Fault
PBx ☐ At Limit
PBx ☐ Alarm
PBx ☐ Comm Error

☐ C-Interlock 1 IC1
BX ☐ Proc. Interlock 2 IB2
BX ☐ Proc. Interlock 4 IB4
BX ☐ Proc. Interlock 1 IB1
BX ☐ Proc. Interlock 3 IB3
BX ☐ Seq. Interlock IA

☐ Check Status/Limits
☐ Not At Reference
☐ Repeat Fail Blk

Speed	1370	rpm
Power	0.2	Kw
Current	1.3	A
Torque	150	Nm

■ Central
☐ Local
☐ Jog
☐ Drive local
☐ Out of Service

■ Man
☐ Auto

Speed 800.0 rpm
SP Speed 80.0 %
Ext SP Spd 75.0 %
Current 44.0 %

Point of control and mode

Operator controlled set point, speed and current is returned from drive

Figure 1-3. Drive Object Display with Speed and Current as Actual Values from Drive

Configuration

The control part of the DRICONE are built on a number of PC-elements and DB-elements formed to a type circuit. The DRICONE consists of the following parts:

- PC- elements for data exchange with the DRIVE. The PC-elements are:
  - DRI-S sending data to the Drive.
  - DRI-R receiving data from the Drive.
- The PC- element DRI-CNV converts and scales values (set points and actual values) which are exchanged with the Drive.
- The data base element DRIENG sets up the communication to the Drive.
- The data base element MMCX defines data mainly for operator displays and event handling.
- Other PC-elements which make the logic for interlock handling and data conversion.
- Display elements which define the appearance in the operator station.

Figure 1-4 shows the basic configuration principle with the Drive.

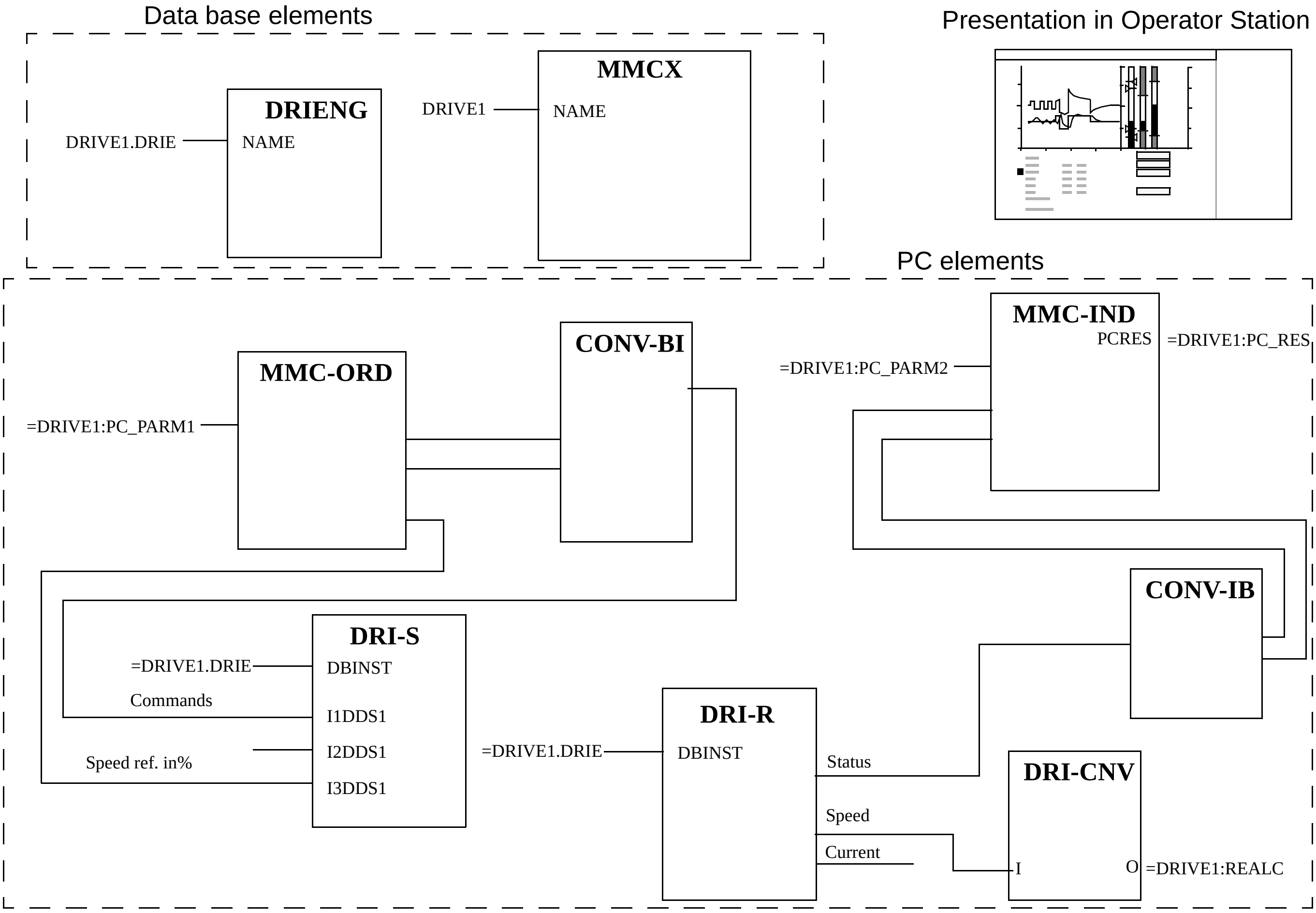


Figure 1-4. Basic Configuration Principle

Event handling

Errors from the Drive generates alarms and status changes generates event on the operator station. There are different ways of blocking alarms.

Errors in the drive can be reset from the operator station. Detailed error diagnostic can be obtained from standard displays on the operator station for DRICONE.

1.9 User Interface

All user interaction with DRICONE is done in the standardized way used throughout the AdvaCommand and Advant Controller 400 Series, both for building applications and for everyday operation. See *AdvaCommand Basic Functions User's Guide* and the User's Guides for the Engineering Stations.

In the Operator Station, you use display elements in composing process displays, according to the methods described in *AdvaBuild Display Builder User's Guide*. The DRICONE display element are located below a separate headline in the display builder.

Chapter 2 Installation

This chapter describes the additional planning for installation of Drives together with AC 400 controllers and Advant Fieldbus 100.

This chapter does not give the complete list of measures to be taken with respect to installation of Drives, S800 I/O and Advant Fieldbus 100. For installation of the previous mentioned equipment see the manuals of *Programming Manual ACS 600 MultiDrive, Software Description DCS 600 Multi Drive, S800 I/O User's guide* and *Advant Fieldbus 100 User's Guide*.

Since each system is designed to meet a specific requirement, there is no standard configuration that describes every system. Therefore, certain areas of the following instructions are meant only as a guide for planning a specific installation. However, some of the information covers specific requirements for proper system and equipment operation, and is not subject to modification.

All information given in this chapter relates to standard equipment.

2.1 Site Planning

When planning a Drive installation in conjunction with AC 400 controllers, please consider the following:

- Surrounding environment and atmosphere.
- The temperature in the room where the equipment is to be located. This should include an estimation of the resulting temperature rise with respect to the power dissipation from the planned equipment.
- Proximity of the equipment to the process.
- Size of the cabinets to accommodate all the required equipment.
- Minimum distances from a cabinet to walls and ceiling to obtain satisfactory results from different aspects.
- Ease of access for moving equipment in and out of area.
- Free space in front of cabinets. Also consider the need of space to fully open a cabinet door either left hand or right hand hinged.
- Spare area for future expansion of the system.
- Grounding by an effective plane of copper bars.
- Cable routing with respect to installation rules.
- Availability of power and other utilities.

The following sections examine some of these factors in detail and provide recommendations and requirements as necessary.

2.1.1 Layout of I/O Station and Drives

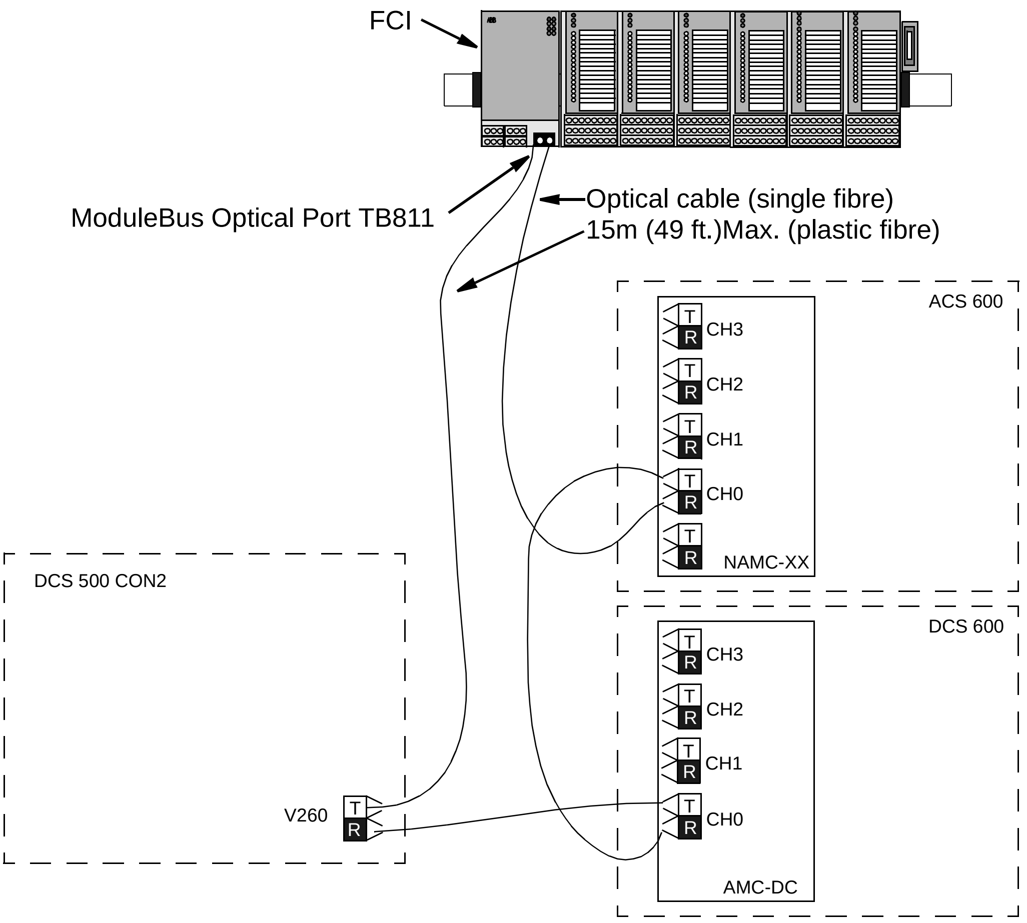
The FCI provides fibre optical expansion of the ModuleBus for up to 12 additional engineered Drives. The maximum number of S800 I/O modules and Drives connected to one FCI is according to the formula below.

$$2 \times \text{engineered drive} + \text{I/O modules} + \text{standard drives} \le 24$$

The Drives can be connected in the following ways:

- Ring connection
- Star connection, by using an Distributed Branching Unit.

The optical ring connection allows for a maximum distribution of 15m (49 ft.) (plastic fibre) between each peer on the ring, see example in Figure 2-1..


FCI
ModuleBus Optical Port TB811
Optical cable (single fibre)
15m (49 ft.)Max. (plastic fibre)
ACS 600
T
R
CH3
CH2
CH1
CH0
NAMC-XX
DCS 500 CON2
V260
DCS 600
AMC-DC

T=Transmitter, R=Receiver, NAMC, AMC-DC, CON2=Application and Motor Control Board

Figure 2-1. Ring Connections of Drives to FCIs

All drives will stop communicating to the FCI if one Drive is disconnected in the optical ring.

A Drive is disconnected from the ring by means of turning of the power to the Application and Motor Control Board board or by removing any fibre going to/from the Application and Motor Control Board board

The star connection allows for a maximum distribution of 200m (667 ft.) (HCS fibre) between ModuleBus optical port TB810 and the Distributed Branching Unit. The star connection allows for a maximum distribution of 15m (49 ft.) (plastic fibre) between each Drive and the Distributed Branching Unit, see example in Figure 2-2.

With the star connection all other drive remain operational if one drive is switched off or removed. In this sense the star connection is more robust.

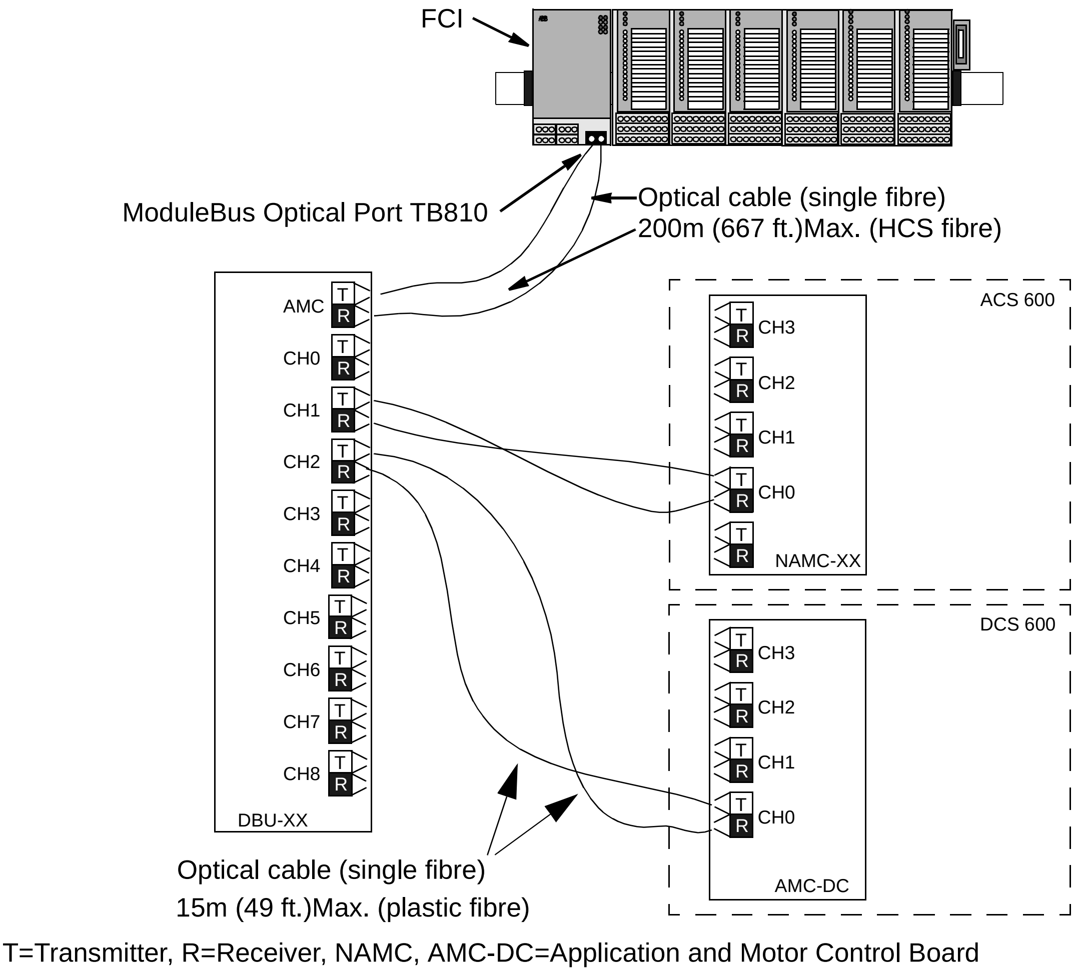

FCI
ModuleBus Optical Port TB810
Optical cable (single fibre)
200m (667 ft.)Max. (HCS fibre)
AMC
CH0
CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
T
R
DBU-XX
ACS 600
CH3
CH2
CH1
CH0
NAMC-XX
DCS 600
CH3
CH2
CH1
CH0
AMC-DC
Optical cable (single fibre)
15m (49 ft.)Max. (plastic fibre)
T=Transmitter, R=Receiver, NAMC, AMC-DC=Application and Motor Control Board

Figure 2-2. Star Connections of Drives to FCIs

The Drive can only be used in a simplex optical configuration. In the simplex configuration the Drives are connected in a ring or a star.

The optical ModuleBus Extension fibre optic (simplex plastic fibre) cable comes in the following standard length:

- TK812V015 - 1.5 meters (5ft.)
- TK812V050 - 5 meters (16 ft.)
- TK812V150 - 15 meters (49 ft.).

Optical ModuleBus Expansion

In order to connect Drives to the FCI, the FCI provides fibre optic expansion of the ModuleBus. A TB811 or TB810 ModuleBus Optical Port must be inserted in to the CI810 FCI to provide optical ModuleBus expansion. It is important to select the correct ModuleBus Optical Port. A ring configuration uses TB811 and a star configuration uses TB810. See Figure 2-3 for location of the TB811or TB810:

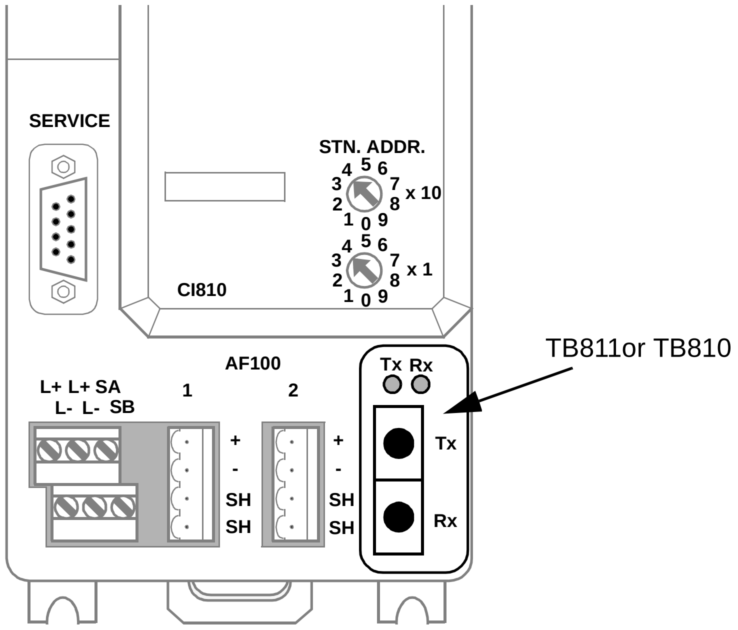


Figure 2-3. Location of TB810 or TB811 ModuleBus Optical Port in CI810 FCI

2.2 Installation Procedures

The basic installation of FCI and Drives are described in manuals *S800 I/O User's guide* and *Programming Manual ACS 600 MultiDrive*. In the following sections you will find additional information in order to get a working data exchange with Drives.

2.2.1 Drive

Address setting

The Drive address should be set according to the allowed address ranges for different position number defined by the DRIENG DB-element, see Table 2-1.

Table 2-1. Allowed Addresses in Drive

Position number in DRIENG DB-element	Allowed addresses
101 - 112	17 - 28
201 - 212	33 - 44
301 - 312	49 - 60
401 - 412	65 - 76
50 - 512	81 - 92
601 - 612	97 - 108
701 - 712	113 - 124

Channel 0 baudrate

The baudrate for channel 0 must agree with the baudrate on the ModuleBus. The baudrate for channel 0 must be set to 4 Mbit/s. This is accomplished by setting the appropriate parameter in the drive see manual *Programming Manual ACS 600 MultiDrive* or *Software Description DCS 600 Multi Drive*.

2.2.2 Type Circuit

The installation of the type circuit is described in manual *FCB Type Circuits Drive Objects User's Manual*.

2.2.3 AdvaCommand

DRICONE display element and dialogs are normally distributed as an option to the operator station software. The option is loaded when the operator station software is loaded see manual *Advant Station 500 Series Operator Station User's Guide*.

In order to load the DRICONE display and dialogs after the operator station software is loaded proceed as follow:

1. Load the Upgrade tape into a DAT tape drive at SCSI port 3.
2. Open a terminal window.
3. Log in as the superuser (root).
4. At the $ prompt enter: `su -`
5. Enter your root password.

6. Enter one of the 2 following commands
   - file set is loaded for the first time:
     `swinstall -s /dev/rmt/0m ABB-OS-DRIVES.RUN`
   - fileset is already loaded:
     `swinstall -xreinstall=true -s /dev/rmt/0m ABB-OS-DRIVES.RUN`
7. At the # prompt, enter: **`exit`** to exit session as root user.
8. Make a functional restart of the operator station.

The fileset could also be distributed via Lotus Note database. Proceed as follow:

1. Open a terminal window
2. Log in as the superuser (root)
3. At the $ prompt enter: **`su -`**
4. Enter your root password.
5. copy the file `ABB-OS-DRIVES.depot` from Lotus Notes to `/tmp/ABB-OS-DRIVES.depot`
6. Do one of the following commands:
   - file set is loaded for the first time:
     `swinstall -s /tmp/ABB-OS-DRIVES.depot ABB-OS-DRIVES.RUN`
   - fileset is already loaded:
     `swinstall -xreinstall=true -s /tmp/ABB-OS-DRIVES.depot ABB-OS-DRIVES.RUN`
7. Make a functional restart of the operator station.

2.3 Shut-down Procedures

The shut-down procedures are described in manuals *S800 I/O User's guide* and *Programming Manual ACS 600 MultiDrive* or *Software Description DCS 600 Multi Drive*.

2.4 Start-up Procedures

This section includes power up for the very first definition/configuration of the system resources.

2.4.1 Power up Controller and Drive

1. Check that the circuit breakers on the power switch units are switched off.
2. Switch on the mains power, and check for correct mains voltage with a multimeter.
3. Switch on the circuit breaker on the power switch unit(s).
4. Switch on the power to the Drive.

5. The following cases are of interest in starting up an S800 I/O station and a Drive:
    a. Without Drive configuration in controller and without defined communication in Drive to control system
    b. Without configuration but with defined communication in Drive to control system
    c. With configuration but without defined communication in Drive to control system
    d. With configuration and defined communication in Drive to control system.

In order to have the described behaviour of the Tx and Rx Led on TB810 or TB811 no Drive should have communication as defined in Step 6 and Step 8.

6. Without Drive configuration in controller and without defined communication in Drive to control system:
    a. Indication on TB 811or TB810

       Tx and Rx Leds are off
    b. Indication on Drive Panel

       The actual values are shown.
7. Without configuration but with defined communication in Drive to control system
    a. Indication on TB810 or TB811

       Tx and Rx Leds are off
    b. Indication on Drive Panel.

       Fault text: **`***FAULT*** CH0 COM LOS`**
8. With configuration but without defined communication in Drive to control system
    a. Indication on TB810 or TB811

       Tx and Rx Leds are pulsating
    b. Indication on Drive Panel

       The actual values are shown.
9. With configuration and defined communication in Drive to control system
    a. Indication on TB810 or TB811

       Tx and Rx Leds are on
    b. Indication on Drive Panel

       The actual values are shown.

Chapter 3 Configuration/Application Building

3.1 Design Considerations

The purpose of this section is to give useful hints regarding configuration, and point out some design questions that should be answered, in order to get a Drive configuration that fits to the process conditions.

3.1.1 Structure of Functional Unit in Controller

The following main parts should be designed and considered when the DRICONE is made:

- Orders from the Operator Station
- Setpoint handling
- Fault analysis
- Interlock
- Point of Control and Mode selection
- Start/Stop logic
- Drive Data Sending
- Drive Data Receiving
- Indications to Operator Station.

The block diagram in Figure F-1 shows how the parts interact. The following sections describe the internal parts of the main parts and program examples 3.1.5 - 3.1.10.

A complete DRICONE controller function is obtained by using the type circuit described in manual *FCB Type Circuits Drive Objects User's Manual*.

3.1.2 Fieldbus Scan Times

The data rate for Drive data exchange on the field bus AF100 is determined by the scan time. The input terminals IOSCANT1 and IOSCANT2 on the DB-element DRIENG sets the scan time. You should consider the following issues when the scan times are selected:

- Process and motor dynamic, how fast must a setpoint change be carried out
- Acceptable delay to PC-program for the drive
- Bus load generated by the selected scan time
- Amount of I/O and other Drives.

The default value of the scan time gives an insignificant contribution to the bus load. If you select a scan time lower than 16 ms, a total calculation of the bus load is needed.

3.1.3 Addressing of Drive

From an addressing point of view is the Drive considered to be as any other S800 I/O. This means that the drive is composed of the components:

- AF100 bus number
- CI 810 I/O station number
- Position on the module bus.

The configuration of the drive is done both in the DRIENG DB-element and in the drive itself.

A Drive is connected on the optical module bus. The allowed position numbers on the DRIENG DB-element are 101 - 112, 201 - 212, .. 701 - 712.

The optical module bus is connected to channel 0 of the Application and Motor Control Board board in the Drive. The address of channel 0 must be possible to configure. The allowed addresses which can be set in the drive are shown in Table 2-1. A manual transformation of the position number, set in the DRIENG DB-element must be done when the address in the Drive is set, in order to have a match between addresses.

The position number 101 - 712 are stored in 8 bits, which should be mapped to regular 8 bit integer format. The formula below shows the conversion.

$$16 \times \text{hundred number in position number} + \text{the rest of the position number}$$

Below is an example how the position number of 311 is transformed to an address which should be set in the Drive.

$$311 \rightarrow 3 \times 16 + 11 = 59$$

Table 3-1 shows the relation between position number and address setting in Drive:

Table 3-1. Example of Address Conversion

Position number in DRIENG	Address setting in Drive
101	17
112	28
201	33
212	44
701	113
712	124

Configuration in Drive

The configuration of the Drive is done in the Adaptive Motor Control table shortly called the AMC table. This paragraph deals with the needed configuration to achieve communication with the control system AC 400.

Since the DRICONE may work with different software versions of engineered drives, the specific parameter groups cannot be specified in this book. The drive configurator must look in the appropriate drive manual in order to find the parameter groups to be modified to achieve communication with the control system.

The following parameters must be considered:

Node address
The node address of the drive is according to formula as described in this chapter.
The node address is set with a parameter called CH0 NODE ADDR for ACS 600 and the parameter is called FIELDBUS NODE ADD for DCS 500.

Baudrate
The CI 810 works with a baud rate of 4 Mbit/s on the module bus. This baud rate is set in the drive with a parameter called CH0 BAUD RATE. For a DCS 500 drive the baudrate is set to 4 Mbit/s and cannot be changed.

Time-out time
The parameter CH0 TIMEOUT specifies the delay time before a communication fault is declared in the drive. The value of the Time-out time must be greater than the data scanning time in the FCI. See Chapter 3.2.2, Data Scanning for calculation of the Drive and I/O scan cycle time.

Communication module
The type communication module type defines the number of drive data sets and the numbering of drive data sets which are exchanged with the drive. Table 3-2 shows different setting of the COMM MODULE parameter for an ACS 600 with System Application.

Table 3-2. Setting of COMM MODULE Parameter

COMM MODULE	Number of Drive Data Sets in each direction	First Drive Data Set number	Comment
NO	-	-	No data exchange with controller
FBA	2	1	
APC	10	10	

The parameter FIELDBUS_PAR.1 in a DCS 500 defines the type of fieldbus adapter. This parameter should be set to DDCS in order to have communication with an Advant Controller.

The DRIENG DB-element reads some data from the Drive during start-up, that is when the DB-element goes form Configuration state to Operational state. The controller assumes that the data below are located in parameter groups specified for a **ACS 600 with System Application**.

The data read from the drive and their parameter groups and indices are shown in Table 3-3:

Table 3-3. Parameters Read from Drive

Parameter	Group and index
Speed Scale factor	50,01
Nominal Voltage	99,02
Nominal Speed	99,05
Nominal Power	99,06

If the parameters doesn't exist in the drive a 0 is shown for the parameters above on the output terminals of the DRIENG DB-element.

3.1.4 Cycle Times

The cycle times for the PC elements handling the Drive control is configured in their execution unit (the control module). You should take the following things into account when the cycle time is selected.

- Demand on response for Drive Control
- Load in controller
- Acceptable delay in response to operator actions.

3.1.5 Drive Data Set Configuration

The mechanism for the Drive to exchange data with the control system is via Drive Data Set. They are called Data Set in Drive manuals but in order to distinguish them from the controller to controller data transfer mechanism which is also called Data Set. The Data Sets in the Drive will be called Drive Data Set in this manual.

The Drive Data Sets which the controller sends data to (commands and setpoints) are called Send Drive Data Sets and the controller receives data (status and actual values) from the Receive Drive Data Sets.

When the control system writes data to a Send Drive Data Set x, data is then received from the next Receive Drive Data Set x+1.

The COMM MODULE parameter can be set according to Table 3-2. Table 3-4 shows the Drive Data set numbering for an ACS 600 with System Application and communication module set to APC, or a DCS 600 drive. Table 3-5 show the Drive Data set numbering for an ACS 600 with System Application and communication module set to FBA, or a DCS 500 drive.

Table 3-4. Drive Data Set Numbering in ACS 600 with System Application and Communication Module set to APC or DCS 600 Drives

Send Drive Data Set	Receive Drive Data Set
10	11
12	13
:	:
24	25

Table 3-5. Drive Data Set Numbering in ACS 600 with System Application and Communication Module set to FBA or DCS 500 Drives

Send Drive Data Set	Receive Drive Data Set
1	2
3	4

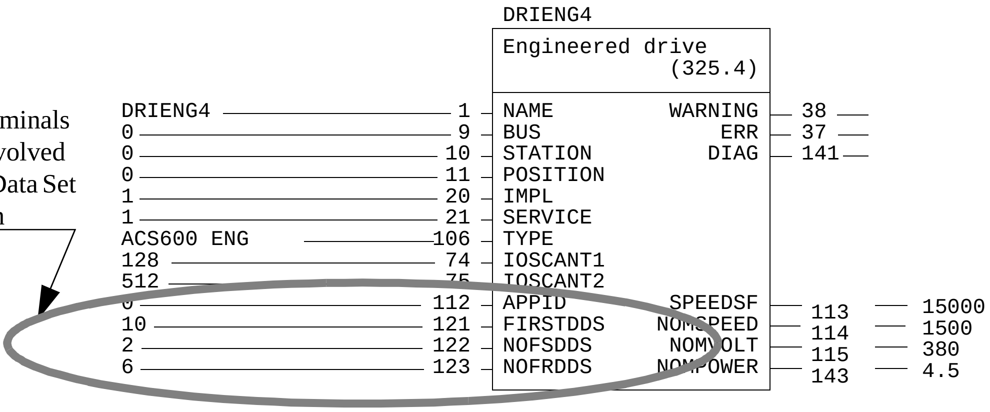
A programmable Drive allows the user to use any arbitrarily Drive Data Set numbering. If the first Send Drive Data Set starts with **X**, the Drive Data Sets according to Table 3-6 can then be exchanged with the control system.

Table 3-6. Drive Data Set Numbering in Programmable Drive

Send Drive Data Set	Receive Drive Data Set
X	X+1
X+1*2	X+2*1+1
:	:
X+10*2	X+10*2+1

Drive Data Set Configuration in DRIENG DB-element

Figure 3-1 shows the input terminals involved in Drive Data Set configuration of the DRIENG DB-element.



The input terminals below are involved in the Drive Data Set configuration

Figure 3-1. Input Terminals involved in Drive Data set Configuration

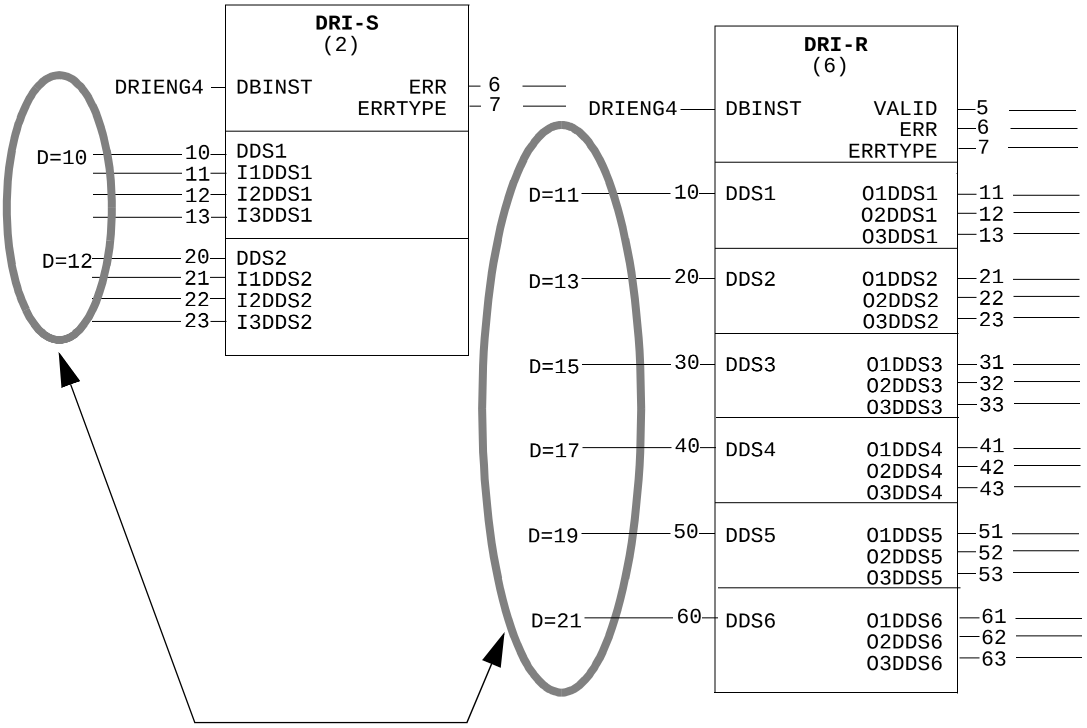
The user defines the first Send Drive Data Set which is going to send data to the Drive on input terminal FIRSTTDDS. The user defines also the total number of Send Drive Data Set on input terminal NOFSDDS. The total number of Receive Drive Data Set is defined in input terminal NOFRDDS. It is recommended to have the values on the terminals NOFSDDS and NOFRDDS equal, even if the number Send Drive Data Sets are less than the number Receive Drive Data Sets.

The Drive Data Sets the control system uses for data exchange are in consecutive order, started from the value of FIRSTDDS.

Example
Figure 3-1 shows a configuration where the Drive Data Sets used for send data are 10 and 12 and the Drive Data Sets used for receive data are 11, 13, 15, 17, 19 and 21

Drive Data Set Configuration in DRI-S and DRI-R PC-element

The DRI-S and DRI-R PC-element exchange run time data. PC element DRI-S sends data to the Drive and PC-element DRI-R receives data from the drive.


DRI-S
(2)
DRIENG4
DBINST
ERR
ERRTYPE
6
7
D=10
D=12
10 DDS1
11 I1DDS1
12 I2DDS1
13 I3DDS1
20 DDS2
21 I1DDS2
22 I2DDS2
23 I3DDS2
DRI-R
(6)
DRIENG4
DBINST
VALID 5
ERR 6
ERRTYPE 7
D=11 10 DDS1 O1DDS1 11 O2DDS1 12 O3DDS1 13
D=13 20 DDS2 O1DDS2 21 O2DDS2 22 O3DDS2 23
D=15 30 DDS3 O1DDS3 31 O2DDS3 32 O3DDS3 33
D=17 40 DDS4 O1DDS4 41 O2DDS4 42 O3DDS4 43
D=19 50 DDS5 O1DDS5 51 O2DDS5 52 O3DDS5 53
D=21 60 DDS6 O1DDS6 61 O2DDS6 62 O3DDS6 63

Input terminals involved for addressing of
Drive Data Set

Figure 3-2. Drive Data Set Configuration on PC Elements

Call parameter C1determines the number of Drive Data Set involved in the data exchange. The PC-elements in Figure 3-2 are configured for 2 Drive Data Set to the Drive and 6 Drive Data Sets from the Drive. The input terminal DDSx addresses the Drive Data Set to exchange data with. The value of DDSx must agree to the allowed series of Drive Data Set number defined for the PC-element done in the DRIENG DB-element.

Example
The allowed Drive Data Sets for the PC-element in Figure 3-2 are:
10 and 12 for DRI-S
11, 13, 15, 17, 19 and 21 for DRI-R

3.1.6 Command and Status Word

Command handling

Commands to the Drive origin either from the Dialog or internal PC-logic. All command flags must be packed to Integer 16 format before they are sent to the Drive. Table 3-8 shows the layout of the command word for an engineered drive with ABB Drive profile. Table 3-9 shows the layout of the command word for a DCS 500 drive.

The PC-element MMC-ORD transfers the orders from the dialog to the PC-logic. To get data to the Drive additional PC-elements must be used to connect the signals from the MMC-ORD to DRI-S. The MMC-ORD element is connected to the MMCX DB-element which handles the presentation and dialog for the Drive. The order bits are laid out according to Table 3-7.
The order bits which can be sent down to drive are MORD02, MORD03 and MORD08.

Table 3-7. Orders in MMC-ORD PC Element

Name	**Use**
MORD00	
MORD01	
MORD02	Start drive
MORD03	Stop drive
MORD04	Block interlocks IB1 and IB3
MORD05	Reset block interlocks IB1 and IB3
MORD06	Operator controlled setpoint
MORD07	External controlled setpoint
MORD08	Reset drive fault
MORD09	
MORD10	Point of control is CENTRAL, sets the enable flag of the drive to 1
MORD11	Point of control is LOCAL, sets the enable flag of the drive to 1
MORD12	Point of control is JOG, sets the enable flag of the drive to 1
MORD13	Point of control is OUT OF SERVICE, sets the enable flag of the drive to 0
MORD14	Control mode is MAN
MORD15	Control mode is AUTO

Table 3-8 shows the order data for an engineered drive with ABB Drive profile.

Table 3-8. Commands toEngineered Drive with ABB Drive Profile

Bit #	Name	Value	Description	Terminal on DRI-S
0	ON	1	Command to "RDYRUN" state. The Drive can be started if there are no other interlocks.	I1DDS1
		0	Command to "OFF" state is set. The ON command is handled by the PC-logic.	
1	OFF2	1	Emergency OFF	I1DDS1
		0	Command to "ON INHIBIT" state The drive coasts down The OFF2 command is handled by the PC-logic.	
2	OFF3	1	No emergency stop	I1DDS1
		0	Command to "ON INHIBIT" state The Drive stops as fast as possible The OFF3 command is handled by the PC-logic.	
3	START	1	Run with the selected reference. Drives goes to RDYREF state	I1DDS1
		0	Stop drive by coasting	
4	RAMP_OUT_ZERO	1	Normal operation	I1DDS1
		0	Speed ramp output is forced to zero. The RAMP_OUT_ZERO command is handled by the PC-logic.	
5	RAMP_HOLD	1	Enable ramp function	I1DDS1
		0	Speed ramping stopped The RAMP_HOLD command is handled by the PC-logic.	
6	RAMP_IN_ZERO	1	No other activities	I1DDS1
		0	Speed ramp input is forced to zero. The RAMP_IN_ZERO command is handled by the PC-logic.	
7	RESET_FAULT	0 ->1	Reset drive fault. The "1" must be kept up approximately 1 second.	I1DDS1

Table 3-8. Commands toEngineered Drive with ABB Drive Profile (Continued)

Bit #	Name	Value	Description	Terminal on DRI-S
8	INCHING1	1	Constant speed 1 defined by a parameter is used.	I1DDS1
9	INCHING2	1	Constant speed 1 defined by a parameter is used.	I1DDS1
10	REMOTE_CMD	1	Overriding computer is requested to control the drive.	I1DDS1
		0	Current speed is frozen.	

Table 3-9 shows the order data for a DCS 500 drive.

Table 3-9. Commands to DCS 500 Drive

Bit #	Name	Value	Description	Terminal on DRI-S
0	ON	1	Command to "RDYRUN" state. The Drive can be started if there are no other interlocks.	I1DDS1
		0	Command to "OFF" state is set. The ON command is handled by the PC-logic.	
1	RUN	1	Run with the selected reference.	I1DDS1
		0	Stop drive by coasting	
2	OFF3	1	No emergency stop	I1DDS1
		0	Command to "ON INHIBIT" state The Drive stops as fast as possible The OFF3 command is handled by the PC-logic.	
3 & 6	RAMP_IN_ZERO	1 & 1	No other activities	I1DDS1
		0	Speed ramp input is forced to zero. The RAMP_IN_ZERO command is handled by the PC-logic.	
4	RAMP_OUT_ZERO	1	No other activities	I1DDS1
		0	Speed ramp output is forced to zero. The RAMP_OUT_ZERO command is handled by the PC-logic.	

Table 3-9. Commands to DCS 500 Drive (Continued)

Bit #	Name	Value	Description	Terminal on DRI-S
5	RAMP_HOLD	1	No other activities	I1DDS1
		0	Speed ramping stopped The RAMP_HOLD command is handled by the PC-logic.	
7	RESET_FAULT	0 ->1	Reset drive fault. The “1” must be kept up approximately 1 second.	I1DDS1
10	REMOTE_CMD	1	Overriding computer is requested to control the drive.	I1DDS1
		0	Speed is taken from other source.	

Example
Figure F-3 and Figure F-11shows parts of a PC-program which packs orders and sends them to the Drive.

Status handling

The main status from the Drive appears on the output terminal O1DDS1 and auxiliary status appears on the output terminal O1DDS2 on the DRI-R PC-element. The main status and auxiliary status word are in Integer 16 format. The main status and auxiliary status word must be unpacked to single boolean flags before it can be presented on the Operator Station. Table 3-10 shows the layout of the main status word for an engineered drive with ABB Drive profile. Table 3-11 shows the layout of the auxiliary status word for an engineered drive with ABB Drive profile.

Table 3-12 shows the layout of the main status word for a DCS 500 drive.

The PC-element MMC-IND handles the status from the Drive. The events and alarms are time stamped by the MMC-IND PC-element. The MMC-IND element is connected to the MMCX DB-element which handles the presentation and dialog for the Drive.

Table 3-10 shows the layout of the main status word for an engineered drive with ABB Drive profile. The table shows also connection of the status bits to the input terminals of the MMC-IND PC-element.

Table 3-10. Main Status from Engineered Drive with ABB Drive Profile

Bit # in O1DDS1	Name	Value	Description	Terminal on MMC-IND and Indication Bit	Alarm or Event Treatment
0	RDYON	1	Drive is ready to switch on	IND20 IND2_00	EVENT
		0	Drive is not ready to switch on		
1	RDYRUN	1	Ready to be started	IND21 IND2_01	EVENT
		0	Not Ready		
2	RDYREF	1	Drive is running	IND22 IND2_02	EVENT
		0	Drive is stopped		
3	TRIPPED	1	Active fault in Drive	IND111 IND1_11	ALARM
		0	No active fault in Drive		
4	OFF_2_STA	1	No emergency (OFF2 inactive)	IND24 IND2_04	EVENT
		0	Emergency coast stop		
5	OFF_3_STA	1	No emergency stop (OFF3 inactive)	IND25 IND2_05	EVENT
		0	Fast Emergency stop		
6	ON_INHIBITED	1	Switch on inhibit	IND26 IND2_06	EVENT
		0	Switch on allowed		
7	ALARM	1	Active alarm in Drive	IND17 IND1_07	ALARM
		0	No active alarm in Drive		
8	AT_SETPOINT	1	Drive runs at reference within tolerance	IND27 IND2_07	EVENT
		0	Not at reference, outside tolerance		
9	REMOTE	1	Drive control location is REMOTE	IND29 IND2_09	EVENT
		0	Drive control location is LOCAL panel		
10	ABOVE_LIMIT	1	Frequency or speed value equals or is greater than supervision limit		-

Table 3-11 shows the layout of the auxiliary status word for an engineered drive with ABB Drive profile. The table shows also connection of the status bits to the input terminals of the MMC-IND PC-element.

Table 3-11. Auxiliary status from engineered drive with ABB Drive profile

Bit # in O1DDS2	Name	Value	Description	Terminal on MMC-IND and Indication Bit or Bit in INTWB of fault object	Alarm or Event Treatment
0	LOGG_DATA_READY	1	Content of data logger from drive is readable.	INTWB_00	-
1	OUT_OF_WINDOW	1	Speed is outside tolerance window.	IND11 IND1_01	ALARM
2	EMERG_STOP_COAST	1	Emergency stop function has failed.	IND12 IND1_02	ALARM
3	MAGNETIZED	1	A flux has been activated to the motor.	INTWB_03	-
4	RUN_DISABLED	1	External interlocking in the Drive prevents the run.	IND14 IND1_04	ALARM
5	SYNCH_RDY	1	Synchronous ready status from position counter	INTWB_05	-
6	1_START_NOT _DONE	1	Not started after the parameters are set in group 99. (Not valid for DCS 600)	IND16 IND1_06	ALARM
7	IDENTIF_RUN_DONE	1	Identification run has been completed. (Not valid for DCS 600)	INTWB_07	-
8	START_INHIBITION	1	Inhibit of start (Not valid for DCS 600)	IND18 IND1_08	ALARM
9	LIMITING	1	Drive has reached one or several of its limits	IND19 IND1_09	ALARM
10	TORQ_CONTROL	1	Drive is torque controlled	INTWB_09	-
11	ZERO_SPEED	1	Actual motor speed is below the zero speed limit.	INTWB_10	-
12	INTERNAL_SPEED_FB	1	Internal speed feedback selected	-	-

Table 3-12 shows the layout of the main status word for a DCS 500 drive. The table shows also connection of the status bits to the input terminals of the MMC-IND PC-element.

Table 3-12. Status from DCS 500 Drive

Bit # in O1DDS1	Name	Value	Description	Terminal on MMC-IND and Indication Bit	Alarm or Event Treatment
0	RDYON	1	Drive is ready to switch on	IND20 IND2_00	EVENT
		0	Drive is not ready to switch on		
1	RDYRUN	1	Ready to be started	IND21 IND2_01	EVENT
		0	Not Ready		
2	RUNNING	1	Drive is running	IND22 IND2_02	EVENT
		0	Drive is stopped		
3	FAULT	1	Active fault in Drive	IND111 IND1_11	ALARM
		0	No active faults in Drive		
4					
5	EME_STOP	1	No emergency stop	IND25 IND2_05	EVENT
		0	Emergency stop		
7	ALARM	1	Active alarm in Drive	IND17 IND1_07	ALARM
		0	No active alarms in Drive		

Example

Figure F-7 and Figure F-15 shows parts of a PC-program which unpacks status from the Drive and connects status flags to the MMC-IND PC-element.

3.1.7 Scaling and Setpoint Handling of Drive Data

Scaling

Integer 16 is the format used on the AF 100 for data exchange with Drives. The working format in the control system for setpoints and actual values are real. Data to the DRI-S PC-element and data from the DRI-R PC-element must then be converted and scaled. The PC-element DRI-CNV is specially made for converting and scaling data for Drive usage.The DRI-CNV PC-element converts and scales data from integer 16 to real and vice versa. The scaling algorithm is shown in formula below.

$$\mathrm{OUTPUT} = \frac{\mathrm{INPUT} \times \mathrm{OUTREF}}{\mathrm{INREF}}$$

The values of the input reference and output reference depends on the parameter which is going to be scaled. Table 3-13 shows some common parameters and their scaling factors for the DRI-CNV PC-element, when data is going to be sent to the to the Drive.

Table 3-13. Scaling of Data which is Sent to the Drive

Parameter	Description	INREF on DRI-CNV	OUTREF on DRI-CNV
Speed in RPM	Motor speed in rpm. The maximum motor speed used for scaling is determined by parameter SPEED SCALING in the Drive. Parameter group and index 50,01 for ACS 600 with system application.	Maximum speed. This value can be obtained from output terminal SPEEDSF(1) on the DRIENG DB-element or from RPARMAX on the help MMCX DB-element	20000
Speed in %	Motor speed in % of the maximum speed.	RPARMAX on the main MMCX DB-element (Default=100)	20000
Torque	Motor torque. Given in percentage of motor nominal torque.	REALAMAX on the main MMCX DB-element (Default=100)	10000

(1) The value from terminal SPEEDSF on the DRIENG DB-element must be divided by 10 before it is connected to the INREF terminal on DRI-CNV.

Table 3-14 shows some common parameters and their scaling factors for the DRI-CNV PC-element, when data is received from the Drive.

Table 3-14. Scaling of Data which is Received from the Drive

Parameter	Description	INREF on DRI-CNV	OUTREF on DRI-CNV
Speed in RPM	Motor speed in rpm. The maximum motor speed used for scaling is determined by parameter SPEED SCALING in the Drive. Parameter group and index 50,01 for ACS 600 with system application.	20000	Maximum speed. This value can be obtained from output terminal SPEEDSF(1) on the DRIENG DB-element or from REALCMAX on the main MMCX DB-element
Speed in %	Motor speed in % of the maximum speed.	20000	100
Current	Motor current. Given in percentage of motor nominal current.	10	1
Torque	Motor torque. Given in percentage of motor nominal torque	10000	100

(1) The value from terminal SPEEDSF on the DRIENG DB-element must be divided by 10 before it is connected to the INREF terminal on DRI-CNV.

Figure F-11 shows an example how the setpoint speed in rpm is scaled. Figure F-6 shows how the actual speed and current are scaled.

Setpoint handling

The setpoints (speed in rpm, speed in % and torque) can either be operator controlled or externally originated from different data sources. An external setpoint is meant to be a setpoint which is calculated by another PC-program. It may be a PID controller which generates an output reference as a setpoint for the Drive control program.

The data storage for the setpoints of the Drive is the presentation DB-element MMCX. In order to handle all different setpoints possibilities an optional MMCX fault DB-element can be used. You don't need the optional MMCX DB-element, if there are no use for the setpoints: *external speed in rpm* and *operator controlled setpoint in rpm* see Table 3-16.

The fault MMCX DB-element is also used for extended fault handling. A third MMCX DB-element can be used for extended alarm handling. If extended fault and alarm handling is required, the fault MMCX DB-element and the alarm MMCX DB-element must be used regardless if there are no use for the setpoints: *external speed in rpm* and *operator controlled setpoint in rpm*.

In order to distinguish between the main MMCX presentation record and the optional fault and alarm MMCX DB-elements. The records will be called main MMCX DB-element, fault MMCX DB-element and alarm MMCX DB-element.

The selection between operator controlled setpoint and external setpoint is done from the operator dialog. The MMC-ORD PC element reflects the outcome of dialog operations.
The output terminal MORD06 is set if the setpoint is operator controlled setpoint and MORD07 is set if the setpoint is externally controlled. The switching between operator controlled setpoint and external setpoint must be programmed with a PC-element (SW-C). Figure F-11 shows an example of switching between external and operator controlled setpoints in %. Figure F-11 shows an example of switching between external and operator controlled speed setpoints in rpm.

Switching between speed setpoint in rpm and speed or torque setpoint in % is done with discrete PC logic. The internal PC variable name control mode determines if the drive is speed or torque controlled. A "0" means speed control and a "1" means torque control. The internal PC variable name speed reference mode determines if the speed reference is given in rpm or in %. A "0" means speed reference in % and a "1" means speed reference in rpm. The switching between different values of control mode and speed reference mode should also influence the visibility word (INTWB) in the main MMCX DB-element. A switch element and an add element which adds the concerning number to INTWB see Table 3-23. The fault MMCX DB-element is the source for operator speed setpoint in rpm. A second MMC-ORD PC-element connected to the fault MMCX DB-element is needed. Figure F-4 shows the visibility handling and the logic for the control mode and speed reference mode.

Table 3-15 shows the setpoints available in the main MMCX DB-element. Table 3-16 shows the setpoint available in the fault MMCX DB-element.

Table 3-15. Setpoints in Main MMCX DB Element

Name	Description
REALD	External speed setpoint in %
REALE	External torque setpoint in %
REAL_PARAM	Operator controlled setpoint (speed, torque) in %

Table 3-16. Setpoints in Help MMCX DB Element

Name	Description
REALD	External speed setpoint in rpm
REAL_PARAM	Operator controlled setpoint (speed) in rpm

3.1.8 Interlock Configuration

The Drive control can be interlocked by signals from the process and also by signals from other PC-programs. The interlocking are divided into three groups with the following function:

- C-interlock which interlock the object for safety purpose. The safety interlock IC1 cannot be blocked.
- B-interlocks. There can be 4 normal process interlocks, IB1-IB4. The interlocks IB1 and IB3 can be blocked by the operator. The parameter IBF determines whether IB3 and IB4 should work as start interlocks. A start interlocks prevents the motor from starting, but doesn't stop a running motor. IBF is a name of a parameter in the interlocking logic.
- A-interlock. This interlock is used to interlock the drive against other objects such as pumps group starts or other condition in an automatic sequence. The interlock cannot be blocked.

An interlocking is active when the PC-input is 0 (false). The JOG point of control overrides all A and B interlocks.

Interlock texts can be configured in the main MMCX data base element. Table 3-17 shows the connection between interlocks and interlock text terminals in the main MMCX data base element.

Table 3-17. Interlock and Interlock Text Terminals

Interlock	Interlock terminal
IC1	I2_08TXT
IB1	I2_10TXT
IB2	I2_11TXT
IB3	I2_12TXT
IB4	I2_13TXT
IA	I2_14TXT

NOTE

There is no interlock text for terminal I2_09TXT. This terminal must not be configured.

Table 3-18 shows the logic for the interlock presentation on display elements DRISWI01, DRIGR01 and DRIGR02. You read Table 3-18 like this:

The table describes the interlock indication on the status line for group display elements and the object close-up display element.

The presentation written first (X (yellow)) in the table has the highest priority. It means that if all the conditions set for showing an yellow X on the status line is fulfilled then no other conditions will be checked. If any of the conditions are not fulfilled then the display element will check the next and so on until a condition is fulfilled. If none of the conditions are fulfilled then no interlock indication will be shown on the status line.

The first row is interpreted like this:

X (yellow) is the character (and color) you will see on the status line if the following conditions are fulfilled.

RUN = 1 -The drive has to be running.

IB3 = 1 - The interlock flag IB3 has to be set.

IBF = 1 - Start interlock is set.

Override = 0 - Do not override interlock.

Jog = 0 - Jog is not be set.

All other flags are not checked in this first case, therefore they are left blank.

The interlocking logic must be made by individual PC-element Figure F-9 shows an example. The logic for active blocked interlocks must also be made by individual PC-elements Figure F-15 shows an example.

Table 3-18. Interlock Logic for Presentation

Presentation in DRIEWI01, DRIGR01, DRIGR02	RUN IND2_02	IC IND2_08	IB1 IND2_10	IB2 IND2_11	IB3 IND2_12	IB4 IND2_13	IA IND2_14	IBF BOOLF	Override IND2_15	JOG BOOLC	Active overridden Interlock IND1_15
X (yellow)	1				1			1	0	0	
	1					1		1	0	0	
X (green)		1									
			1						0	0	
				1						0	
					1			0	0	0	
	0				1			1	0	0	
						1		0		0	
	0					1		1		0	
							1			0	
BX (red)											1
BX (yellow)										1	0
				1					1		0

3.1.9 Mode and Point of Control Configuration

The operator decides from which location the Drive should be controlled by selecting the point of control. All points of control except DRIVE LOCAL are selected through the dialog in the Operator’s Station. The DRIVE LOCAL point of control is selected from the local panel on the Drive.

Table 3-19 shows the output of the MMC-ORD PC-element for mode and point of control selection.

Table 3-19. Mode and Point of Control Order

Terminal	Description
MORD10	Point of control is CENTRAL
MORD11	Point of control is LOCAL
MORD12	Point of control is JOG
MORD13	Point of control is OUT OF SERVICE
MORD14	Control mode is MAN
MORD15	Control mode is AUTO

Table 3-20 shows the terminal in the main MMCX DB-element and the input terminals on the MMC-IND PC-element for mode and different point of control.

Table 3-20. Mode and Point of Control Indications

Terminal	Description
IND2_09	1=Point of control is CENTRAL 0=Point of control is DRIVE LOCAL
IND2_00	0=Point of control is OUT OF SERVICE
BOOLA	MAN
BOOLB	AUTO
BOOLC	JOG is point of control
BOOLD	LOCAL is point of control

The logic for point of control and mode handling is done by individual PC-elements Figure F-8 shows an example.

3.1.10 Start and Stop

Start and stop command for DRICONE may originate from the dialog in the Operator´s Station or from PC inputs depending on the point of control selection see Table 4-1 in Section 4.1.4, Start and Stop Order at Different Points of Control and Control Modes.

The following conditions must be fulfilled before a start order can be sent to the Drive:

- No interlocks (Jog point of control overrides process and sequence interlocks).
- Drive must be in Central, Local or Jog point of control.
- No unacknowledged alarms.

The motor will run if the following conditions are fulfilled:

- No Emergency command, that means OFF 2 = 1.
- No emergency stop command, that means OFF 3 = 1.
- The commands for ramp functions are as follow:
  - RAMP_OUT_ZERO = 1
  - RAMP_HOLD = 1
  - RAMP_IN_ZERO = 1.

The following conditions executes that a stop order is sent to the Drive:

- Stop order from dialog or PC inputs.
- Interlock.
- Drive is set to Out of Service or Drive Local point of control.
- Emergency command OFF2=0.
- Emergency stop OFF3=0.
- Fault from Drive.
- Communication error with Drive (the stop order is sent immediately after the communication is restored in order to prevent an accidentally start of the Drive).

Figure F-10 shows an example of the start and stop logic.

3.1.11 Configuration of Presentation DB element

The MMCX DB-element stores all the information for the presentation. The main MMCX DB-element stores all basic information and the fault and alarm MMCX DB-elements store information for additional alarm and event handling and additional setpoint handling. Table 3-21 shows the meaning of main MMCX DB-element terminals used by the control part of DRICONE.

Table 3-21. Data Base usage of Main MMCX DB Element

Terminal number	Terminal name	Description
12	RTYPE	DRICONE ref. type is **49**
219	REALA	Actual Torque
220	REALB	Value (frequency, power etc.)
221	REALC	Actual speed
222	REALD	External speed setpoint in %
223	REALE	External torque setpoint in %
65		Set-point (speed, torque) in% when control mode for (speed, torque) in % is selected
73	PC_RES	Result terminal which contains the result of indications, motor current and nominal speed. This terminal is connected to the MMC-IND PC element.
209	BOOLA	MAN
210	BOOLB	AUTO
211	BOOLC	JOG is point of control
212	BOOLD	LOCAL is point of control
213	BOOLE	External setpoint handling
214	BOOLF	Start interlocks IBF are used
218	INTWB	Visibility word, the meaning is shown in Table 3-23

Table 3-22 shows the meaning of the fault MMCX DB-element terminals used by the control part of DRICONE.

Table 3-22. Data Base usage of Fault MMCX DB Element

Terminal number	Terminal name	Description
222	REALD	External speed reference in rpm
223	REALE	Nominal power
232	REALEMIN	Nominal current
233	REALEMAX	Nominal torque
65		Set-point speed in rpm when control mode for speed in rpm is selected
73	PC_RES	Result terminal which contains the result of indications, in terms of additional events and alarms.

INTWB in main MMCX DB-element controls the visibility of setpoints and actual values. Set-points and actual values which are going to presented should have their corresponding bit set in INTWB. Table 3-23 shows the meaning of the individual bit number in INTWB.

The visibility of setpoint values should reflect the usage of the control mode. The speed setpoint in rpm is shown if control mode for rpm is chosen. Speed setpoint in % or torque setpoint in % is shown if control mode for speed or torque is chosen.

Table 3-23. Meaning of Visibility Word INTWB

INTWB Name	Description	Decimal Value
Actual values		
INTWB_00	Speed	1
INTWB_01	Current	2
INTWB_02	Torque	4
INTWB_03	Arbitrarily value	8
Set-point values		
INTWB_11	Speed in rpm	2048
INTWB_12	Speed in %	4096
INTWB_13	NOT USED	
INTWB_14	Torque setpoint	16384
INTWB_15	NOT USED	

The fault or alarm MMCX DB-elements are not required for those applications with no extended fault and alarm handling. Bit 0 and 1 of INTWA in main MMCX DB-element indicates whether there is a fault or an alarm MMCX DB-element. INTWA is configured according to Table 3-24.

Table 3-24. Meaning of INTWA

INTWA name	Description	Decimal value
INTWA_00	Use fault MMCX DB-element	1
INTWA_01	Use alarm MMCX DB-element	2

3.1.12 Fault reset

After a fault has occurred in the drive. The fault in the drive can be reset from the operator station via PC-logic in the controller. The ON bit in the command word must be toggled in order to bring the drive to status ready to be started. Figure F-13 shows an example how the ON bit is toggled.

3.1.13 Extended Fault and Alarm Handling

Engineered drives have the capability to supply the control system with more fault and alarm information. The extended fault and alarm information is available in Drive Data Sets 15 and 17, which can be seen on the outputs on the DRI-R PC-element. The extended alarm and fault information is connected to MMC-IND PC-elements which have references to the fault and alarm MMCX DB-elements. Figure F-15 shows an example.

3.1.14 Auxiliary Status and Limit information

Auxiliary status information is available in Drive Data Sets 13 and Limit information in Drive Data Set 19, which can be seen on the DRI-R PC-element outputs. The outputs of the DRI-R PC-element for auxiliary status is connected to INTWB and limit information is connected to INTWA of the fault MMCX DB-element. Table 3-25 shows the internal bit information of auxiliary status information in INTWB. Table 3-26 shows the internal bit information of limit information in INTWA.

Table 3-25. Auxiliary Status Information in INTWB of fault MMCX DB-Element

INTWB name	Description
INTWB_00	Logg Data Ready
INTWB_03	Motor Magnetized
INTWB_05	Synch Ready
INTWB_07	Identity Run Done
INTWB_10	Torque Control
INTWB_11	Zero Speed

Table 3-26. Limit Information in INTWA of fault MMCX DB-Element

INTWA name	Description
INTWA_00	Torque Motor Limit
INTWA_01	SPC Torque Min. Limit
INTWA_02	SPC Torque Max Limit
INTWA_03	Torque User Current Limit
INTWA_04	Torque Inverter Current Limit
INTWA_05	Torque Min. Limit
INTWA_06	Torque Max Limit
INTWA_07	Torque Reference Min. Limit
INTWA_08	Torque Reference Max Limit
INTWA_09	Flux Min. Limit
INTWA_10	Frequency Min. Limit
INTWA_11	Frequency Max Limit
INTWA_12	DC Under Voltage Limit
INTWA_13	DC Over Voltage Limit
INTWA_14	Torque Limit
INTWA_15	Frequency Limit

Figure F-14 shows an example how auxiliary status and limit information is connected to the fault MMCX DB-element for further presentation on the operator station.

3.1.15 Programmed Blocking of Alarms

A signal connected to the main MMCX data base terminal AL_P_BLK blocks alarm. The signal blocks the alarm also in the fault and alarm MMCX DB-element. It is also indicated in display element that the alarm is blocked.

3.1.16 Event Treatment

The default values of the event treat part of the MMCX data base elements has no event treat pointer defined. The events are also blocked. The configuration of the event treat pointers to obtain standard DRICONE event text for an ACS 600 with system application are according to Table 3-27.

Table 3-27. Event Treat Pointer Configuration ACS 600 with System Application

DB element	I1_TR	I2_TR
main MMCX	336	337
fault MMCX	338	339
alarm MMCX	340	341

Table 3-28. shows the event treat pointers for DCS 600.

Table 3-28. Event Treat Pointer Configuration DCS 600

DB element	I1_TR	I2_TR
main MMCX	336	337
fault MMCX	342	343
alarm MMCX	344	345

The terminals I1_EVBLK and I2_EVBLK block events which are going to be sent to the Operator's Station. All events are by default blocked. In order to have events the I1_EVBLK and I2_EVBLK terminals must be set in main, fault and alarm MMCX DB elements to allow events for the desired signals which can be seen on the MMC-IND PC element input terminals.

3.1.17 Trend Configuration

If you want to be able to use an object trend you have to log the values in a TTD-log.
The values you can log for DRICONE are speed, current and torque. Trend and log configuration are described in *AdvaCommand Basic Functions User's Guide*

3.2 Capacity and Performance

3.2.1 AF100 Fieldbus Loading

Due to the organization of the AF100 scans some constraints are imposed on the transmissions. In order to guarantee that message transfer is possible, at least 25% of the fieldbus load is reserved for transfers. The remaining load (75%) of the fieldbus can be used for S800 I/O Station loading. To calculate the **%loading**, at the required **Cycle Time**, the **CI810** (FCI) loading per station and the **Drive** and **I/O Module Type** quantity times the per cent loading, use table in *S800 I/O User's guide* for CI810 and I/O Module Type figures, for Drive figures see Table 3-29, and use the following formula:

$\text{AF100}_{\%\text{load}} = \text{CI810}_{\text{load}} + \text{S800 I/O Module } 1_{\text{load}} + \text{S800 I/O Module } n_{\text{load}} + \text{Drive } 1_{\text{load}} + \text{Drive } n_{\text{load}}$ ......

The calculated **%loading** should not exceed **70%**.

The following example is for one I/O Station with: One CI810 (FCI), 2 AI810s, 2 AO810s, 4 DI810s, 4 DO810s and 2 DRIENG using 128ms cycle times for the AI and AO modules, using 64ms cycle times for the DI and DO modules, using 16ms for the fast send and receive data of the Drives and using 512ms for the slow send and receive data of the Drives.

> **Example:**
>
> $\text{AF100}_{\%\text{load}} = 0.033\% + (2 \text{ x } 0.197\%_{\text{AI810}}) + (2 \text{ x } 0.221\%_{\text{AO810}}) + (4 \text{ x } 0.138\%_{\text{DI810}}) + (4 \text{ x } 0.146\%_{\text{DO810}}) + (2\text{x}3.150\%_{\text{DRIENG}}) + (2\text{x}0.098\%_{\text{DRIENG}}) = 8.501\%$ Load.

Table 3-29. DRIENG % of Loading on the AF100 Fieldbus for different cycle times on IOSCANT1 and IOSCANT2

Module Type	**Cycle Time in msec.**												
	1(1)	**2(1)**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**4096**
DRIENG	50.4%	25.2	12.6%	6.3%	3.15%	1.575%	0.788%	0.394%	0.197%	0.098%	0.049%	0.025%	0.12%

(1) The bus load caused by cycle times of 1ms and 2ms must be less than or equal to 50% in total.

The total load for generated by DRIENG DB-element is the sum of load for IOSCANT1 and IOSCANT2, see formula below:

$$\text{total load} = (\text{load generated by IOSCANT1}) + (\text{load generated by IOSCANT2})$$

The total load if IOSCANT1 is 16ms and IOSCANT2 is 512 ms is:

$$\text{total load} = 3.15 + 0.098 = 3.248$$

Please refer to the *Advant Fieldbus 100 User's Guide* for complete details of AF100 load calculations and principals.

3.2.2 Data Scanning

The ModuleBus data is scanned (read or written) cyclically, depending on the Drive and I/O module configuration. To calculate the Drive and I/O scan cycle time in the FCI do as follows:

Totalize the number of Drives and I/O modules of type x * used execution time for type x. The execution time for different I/O modules are described in *S800 I/O User's guide* and the execution time for DRIENG see Table 3-30. Increase total value to the nearest multiple of 2 to get the Drive and I/O scan cycle time.

Table 3-30. Drive Scan Cycle Time in the Fieldbus Communication Interface

Drive type	Execution Time Used In ms
DRIENG	1.72

The Drive Data Sets handled by DRIENG will be scanned according to Table 3-31. It is assumed that the Drive Data Set numbering starts at Drive Data Set 10.

Table 3-31. Data scanning of Drive Data Sets for DRIENG

Drive Data Set	Scanning ratio
10 - 13	Every scan cycle
14 - 19	Every 4 th. scan cycle
10 - 23	Every 10 th. scan cycle
24 - 29	Every 40 th. scan cycle

For example a station with 2 AI810, 1 AO810, 2 DI810, 2 DO820, 1 AI830 and 2 DRIENG that will give the following I/O scan cycle time:

2 AI810 =>	2*3.00 =	6.00
1 AO810 =>	1*1.20 =	1.20
2 DI810 =>	2*0.43 =	0.86
2 DO810 =>	2*0.43 =	0.86
1 AI830 =>	1*0.40 =	0.40
2 DRIENG =>	2*1.72 =	3.44
1 CI810 =>	1*1.40 =	1.40

14.16 + (nearest higher value dividable by 2) = 16ms

That will give an I/O scan cycle time of 16 ms between the FCI and its Drive and I/O modules. This means that the Drive Data Sets 10 - 13 in DRIENG will be scanned every 16 ms. Scanning ration of other I/O modules see *S800 I/O User's guide*.

NOTE

Minimum I/O scan cycle time = 4 ms.

3.3 Application Start-up

Please see the User's Guides of the Controller you are referring for application start-up procedures.

3.4 Application Procedures

In the controller you realize the control function by using the type circuit DRIE4 see *FCB Type Circuits Drive Objects User's Manual*. The DRIE4 type circuit works with ACS 600 with system application with software version 4.2 or DCS 600 drive. The type circuit creates DB-element DRIENG and MMCX plus PC-elements for realizing functions described in section 3.1.5 to section 3.1.13. Consideration needs to be taken if additional fault and alarm MMCX DB-element are needed. If you create the DB-elements manually consider the following points after name and description is entered.

DRIENG DB-element

- Addressing of Drive
- Data set configuration

MMCX DB-element (default values being given in parenthesis)

- Range and unit for speed (0 .. 100, "*empty string*")
- Range for current and torque (0 .. 100)
- Process section and class, to use for alarms (0,0)
- Visibility of speed current torque etc. (0)
- Usage of additional fault and alarm MMCX DB-element (0)
- Optional name of interlock texts ("*empty string*").

If you are going to use additional MMCX DB-elements the name of DB-element are the same as the main MMCX DB-element but with the extension **.FL** for fault MMCX DB-element and **.AL** for alarm MMCX DB-element.

If you are going to use non-standard event handling, you may change some properties in the Event Treat part of the MMCX DB-element. The rest of the data base properties are left unchanged, since they will be updated and used in run-time operation.

If you create your own PC program in the controller for the Drive please see the hints and advises in Section 3.1.5, Drive Data Set Configuration to Section 3.1.13, Extended Fault and Alarm Handling.

Since the input terminal DBINST in PC-element DRI-R and DRI-S usually reference the DRIENG DB-element by name , the DB-element should be created before you enter the PC program.

In the Operator Station, you use the display elements in composing process displays, according to methods described in *AdvaBuild Display Builder User's Guide*. The object display and the standard alarm handling are available without any configuring. To use the object trend, you need to create and parameterize a TTDLOG data base instance in the Controller, and then to configure the appropriate logs in the Operator Station, as described in *AdvaCommand Basic Functions*

User’s Guide. The last mentioned manual also describes how you configure events and alarms in case you want to customize, and how to configure group alarm. For alarm sectioning we refer to *AdvaCommand Process Sectioning*.

3.5 Configuration/Application Building Menus

Please consult the User’s Guides for your Engineering Station and your Operator’s Station.

Chapter 4 Runtime Operation

4.1 Product Operation

This section gives a detailed description of the DRICONE function.

4.1.1 FCI Functionality for Drives

This section describes the functionality and services that the FCI (Fieldbus Communication Interface) offers for Drives connected to the FCI. This includes a general description of the data flow on the Advant Fieldbus 100, and how Drives are operated and treated.

The FCI receives dynamic output data from the AF 100 for the Send Drive Data Set. The FCI writes the data to the Send Drive Data Set and receives data from the Receive Drive Data Set.

Concerning Drives the FCI is responsible for:

- Drive module configuration and supervision
- Dynamic data transfer.

In this context Drive module configuration are data needed to establish communication between the FCI and the Drive. It does not mean configuration data in the Drive which defines the control of the motor.

4.1.1.1 Drive Configuration and Supervision

The FCI stores the configuration for all configured Drives in the station.

The FCI will continuously supervise all Drives being configured by the Advant Controller.
It sends the status of all Drives to the Advant Controller via the Advant Fieldbus 100.

When the FCI detects a Drive without configuration, which it has configuration data for, it will automatically read nominal values from the Drive and set it into operational.

4.1.1.2 Dynamic Data Transfer

Figure 4-1 shows all parts involved in the dynamic data exchange.

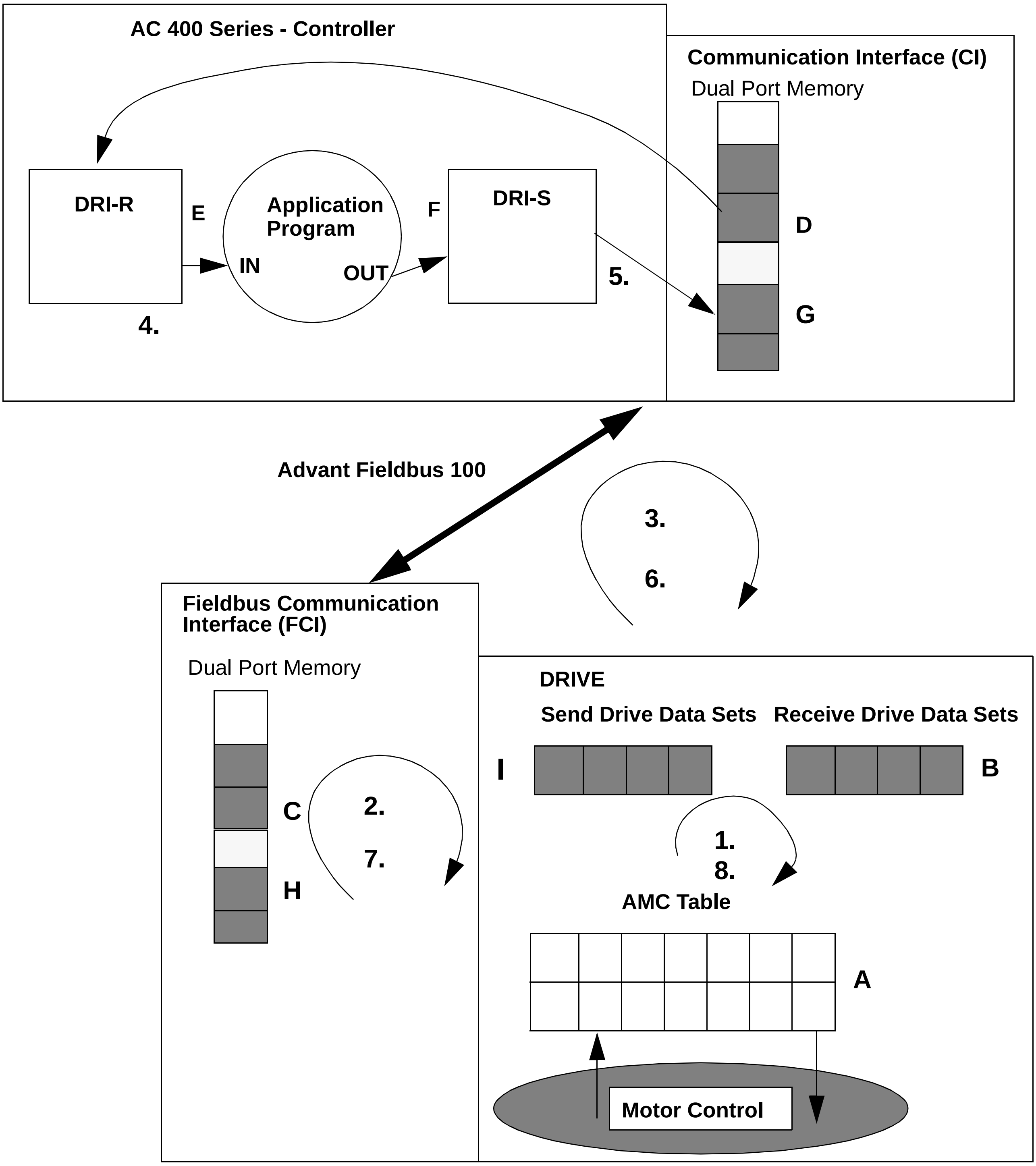


Figure 4-1. Dynamic Data Exchange in Run-time

1. The drive application (system macro) scans the AMC table (**A**) and stores data in the Receive Drive Data Sets (RDDS) for actual values (**B**). Depending on the drive there could either be 1 or several RDDS for actual values. The contents of the Drive Data Set (DDS) are specified by the Drive application macro.
2. The FCI scans all Drive modules cyclically. The FCI writes data to a Send Drive Data Set (SDDS) and read back values are read from the following RDDS. The data in the RDDS are copied to a data area (**C**) assigned for receive data from the drive. There is no signal value treatment, data are just copied.
3. The input values are transferred from the FCI Dual Port Memory (**C)** to the Communication Interface (**D**) by AF100, at a rate configured in the Advant Controller.
4. The input values are read from the Dual Port Memory of the Communication Interface (**D**) to the outputs (**E**) of the DRI-R PC element dedicated for this drive. This is done cyclically at a rate configured by the user in the control module of the PC program. Data is now available for further application processing.
5. The output values (**F**) are written to the Dual Port Memory of the Communication Interface (**G**) by the DRI-S PC element dedicated for this drive. This is done cyclically at a rate configured by the user in the control module of the PC program.
6. The output values are transferred from the Communication Interface (**G**) to the FCI Dual Port Memory (**H**) by the AF100, at same rate specified for input values in the Advant Controller.
7. The FCI updates all drive modules cyclically. The value of all output values are read from the Dual Port Memory (**H**) and copied to the SDDS (**I**). After data to a SDDS (n) is written to the drive read back data from RDDS n+1 is immediately returned.
8. The drive application (system macro) scans all SDDS (**I**) and writes the setpoints to the AMC table (**A**).

Data Scanning Principles

The data transfer between AF 100 and the ModuleBus is not synchronized. Read and write operations are performed from and to a dual port memory in the FCI.

The ModuleBus data is scanned (read or written) cyclically, Dive Data Sets for DRIENG modules are scanned according to Table 3-31.

4.1.2 Drive Functionality regarding ModuleBus Communication

The Drive module has basically the same common functionality as other S800 I/O modules.

A Drive module complies with the following framework:

- General:
  - It has a module identity (see Section 4.1.2.1, Identity).
  - It has a state that can be controlled (see Section 4.1.2.2, States).
  - It reports status for the Drive module.
- Parameters:
  - It has configuration parameters for the module and channels (Drive Data Set).

4.1.2.1 Identity

The Drive must contain a module identity. The module identity is used to verify that a Drive of the expected type is mounted before taking it operational. It protects the system from performing unexpectedly. The identity must be **138** in decimal form for a engineered Drive.

4.1.2.2 States

The figure below shows the states of the Drive module.

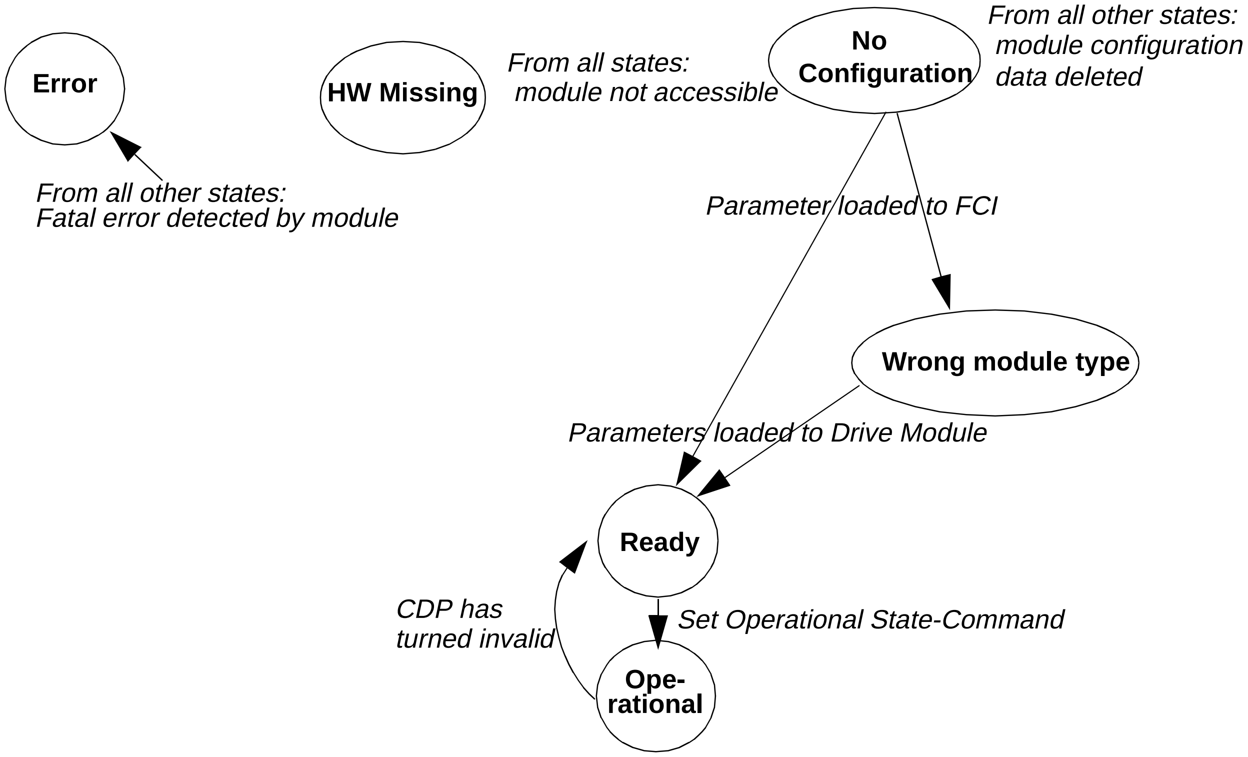


Figure 4-2. Drive Module States

NOTE

> The Drive module state is in no way related to the STATUS of the drive ! It is only relevant for the FCI treatment of the drive.

The state transitions are initiated via commands!

Setting IMPL to 1 would be equal to loading module configuration data.

Setting IMPL to 0 would be equal to deleting module configuration data.

Setting Service to 0 would be equal to set module to ready.

Setting Service to 1would be equal to set module to operational.

Not Configured State

This indicates that no module configuration data is currently available for this specific Drive module instance.

Drive Data Set:	Not exchanged
Communication:	Only writing of configuration data is possible.

Ready State

Entering the Ready state starts the dynamic data transfer on AF100, nominal values are read from Drive and the Modulebus is started.

Drive Data Set:	Not exchanged.
Communication:	All dialogs are possible.

Operational State

This is the state for normal operation.

Drive Data Set:	Drive Data Set are written and read.
Communication:	All dialogs are possible.

Error State

This state will be entered if a fault is detected during configuration.

Drive Data Set:	Not exchanged
Communication:	All dialogs are possible.

No Answer State

The module access failed.

Drive Data Set:	Written or Read depending on the treatment before the access failed.
Communication:	All dialogs are possible.

Wrong module type State

The module type in the module configuration does not match the module type of the physically present module. The FCI continuously tries to configure the module. If the module is replaced by the correct one or the module configuration data is changed the configuration will continue.

Drive Data Set:	Not exchanged
Communication:	All dialogs are possible except Read/Write dynamic values.

4.1.3 Points of Control and Control Modes

The operator decides from which location the Drive should be controlled by selecting the point of control. All points of control except DRIVE LOCAL are selected through the dialog in the Operator's Station. The DRIVE LOCAL point of control is selected from the local panel on the Drive.

Table 4-1 summarizes the point of control.

The functions described in this section is the function implemented by the DRIE4 or DRID1 type circuits described in *FCB Type Circuits Drive Objects User's Manual*.

CENTRAL

The Drive is controlled from operator station or from a superior PC program for example for group start. CENTRAL is the default point of control. Control from other locations is blocked.

Control mode MAN

The operator controls the Drive from operator station. To start, the operator has to press the key START. To stop the Drive, the key STOP has to be pressed.

Control mode AUTO

The process controls the Drive through PC inputs for the type circuit or other control logic which handles the start and stop of the Drive. The operator is able to stop the Drive by issuing stop order from operator station.

LOCAL

The Drive is controlled from a local desk or panel. Control from other locations is blocked. LOCAL point of control, like other points of control, may be selected from operator station.

The control mode MAN is always set when the point of control is LOCAL.

The operator starts and stops the Drive by setting local start or stop to the type circuit or other control logic which handles local start and stop of the Drive.

JOG

The Drive is controlled from a stop/start station adjacent to the motor. The supervision of interlocks is limited. Only the safety interlocks IC1 prevents the Drive from starting. Control from other locations is blocked.

The control modes MAN and AUTO are not available when the point of control is JOG.

The operator starts the Drive by setting jog start forward or reverse to the type circuit or other control logic which handles jog forward and reverse of the Drive. The Drive stops a soon as the jog forward or jog reverse signal disappears.

DRIVE LOCAL

The Drive is controlled from the local panel on the Drive itself. Control from other locations is blocked. The DRIVE LOCAL point of control can only be selected from the Drive panel.

The operator starts and stops the Drive from the Drive panel. The operator can also change the setpoint from the Drive panel.

OUT OF SERVICE

The Drive is stopped and all orders to it are blocked. The STANDBY order is not carried out if the Drive is running.

4.1.4 Start and Stop Order at Different Points of Control and Control Modes

Table 4-1 describes the commands which can be given at the different control modes and points of control of DRICONE.

Table 4-1. Relation Between Commands and Control Modes and Points of Control

Order	Central MAN	Central AUTO	Local panel	Jog	Drive local
Operator start	Start				
Operator stop	Stop	Stop			
PC group start	Start				
PC group stop	Stop				
PC Auto start		Start			
PC Auto stop		Stop			
Jog button on				Start ±20 rpm (default)	
Jog button off				Stop	
Local panel start			Start		
Local panel stop			Stop		
Drive panel start					Start
Drive panel stop					Stop

4.1.5 Interlocks

The Drive control can be interlocked by signals from the process and also by signals from other PC-programs. The interlocking are divided into three groups with the following function:

- C-interlock which interlock the object for safety purpose. The safety interlock IC1 cannot be blocked.
- B-interlocks. There can be 4 normal process interlocks, IB1-IB4. The interlocks IB1 and IB3 can be blocked by the operator. The parameter IBF determines whether IB3 and IB4 should work as start interlocks. A start interlocks prevents the motor from starting, but doesn’t stop a running motor. IBF is a name of a parameter in the interlocking logic.
- A-interlock. This interlock is used to interlock the drive against other objects such as pumps group starts or other condition in an automatic sequence. The interlock cannot be blocked.

An interlocking is active when the PC-input is 0 (false). The JOG point of control overrides all A and B interlocks.

4.2 Operating Overview

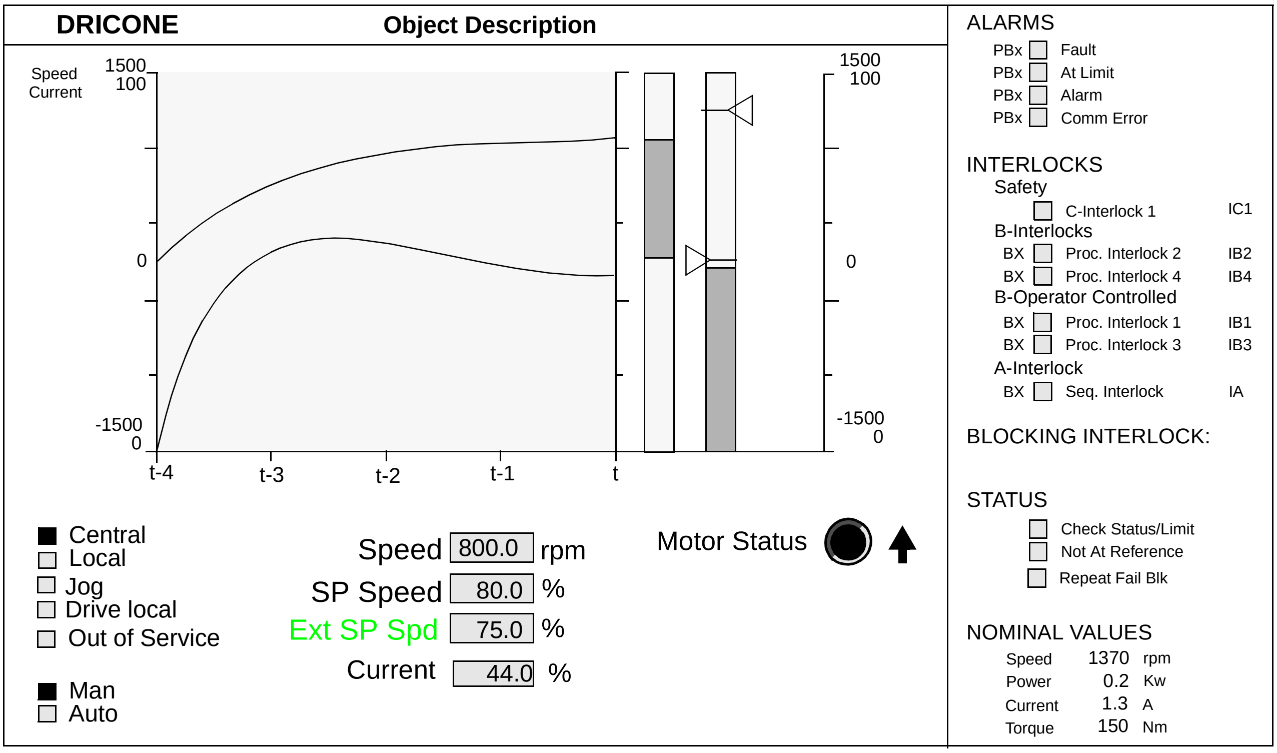
The Operator Station provides presentation of the DRICONE objects and dialogs for the manipulation, and there are functions for the event handling. These are all standard functions in the control system.

In everyday operation you get process information via the displays, both those built for your application, and the object display which provides detailed information without need for configuration. The production level dialog allows you to change point of control, change control mode, to alter the value of the setpoint and to acknowledge alarms.

The alarms and events appear in lists in the Operator Station, and they can also be printed directly as they occur. All alarms have distinct indications in the object display, thus making it very clear what the alarm is about. While the alarm list gives you an overview over all present alarms, the object display also gives you an overview over all alarms that apply to one particular object.The object display informs also the operator about interlocks that may occur.

The object display gives a complete view of the status of the object, including nominal values of the Drive.

With the authority key, the maintenance level dialog can be accessed. It allows you to block alarms and set the Drive out of service



■ Central
☐ Local
☐ Jog
☐ Drive local
☐ Out of Service

■ Man
☐ Auto

Speed 800.0 rpm
SP Speed 80.0 %
Ext SP Spd 75.0 %
Current 44.0 %

PBx ☐ Fault
PBx ☐ At Limit
PBx ☐ Alarm
PBx ☐ Comm Error

☐ C-Interlock 1 IC1
BX ☐ Proc. Interlock 2 IB2
BX ☐ Proc. Interlock 4 IB4
BX ☐ Proc. Interlock 1 IB1
BX ☐ Proc. Interlock 3 IB3
BX ☐ Seq. Interlock IA

☐ Check Status/Limit
☐ Not At Reference
☐ Repeat Fail Blk

Speed 1370 rpm
Power 0.2 Kw
Current 1.3 A
Torque 150 Nm

Figure 4-3. Example of an Object Display for DRICONE

4.3 Operating Instructions

4.3.1 Change Point of Control and Control Mode

The different control modes applicable to DRICONE are described in Section 4.1.3, Points of Control and Control Modes. The present mode is shown in the display elements. In the object display, it is indicated by a green box beside the name of the present mode. In the other display elements an abbreviation of the mode is shown.

Table 4-2. Mode Abbreviations used in Display Elements

Mode and Point of Control	Abbreviation
MAN	M
AUTO	A
Out of Service	O
Drive Local	D
Jog	J

Table 4-2. Mode Abbreviations used in Display Elements

Mode and Point of Control	Abbreviation
Local	L
Central	C

The point of controls for operator selection are: Central, Local, Jog and Out of Service. The point of control are changed from the top level dialog.

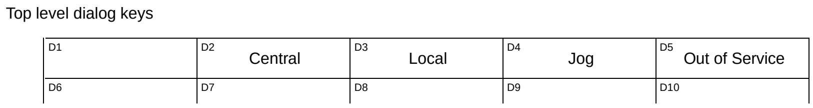


Figure 4-4. Dialog Keys for Selection of Point of Control

The modes available for the operator are: Man and Auto. There are direct access keys and dynamic keys.

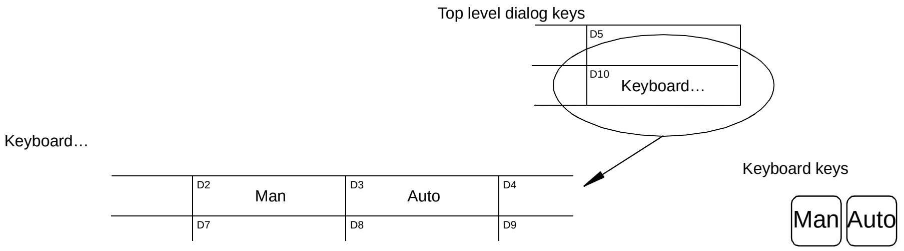


Figure 4-5. Mode Keys

4.3.2 Start / Stop of the Drive

You can start the Drive by the choice “Keyboard...” and the key Start or by the Start direct access key, provided that the point of control is CENTRAL and the mode is MAN. The motor symbol is filled in displays containing the motor symbol. The text “Not at Setpoint” will be shown in object display, and on the status line in object-close-up and group display if the desired setpoint is not reached.

You can stop the Drive by the choice “Keyboard...” and the Key Stop or by the Stop direct access key. There are no restriction for stopping the Drive.

.

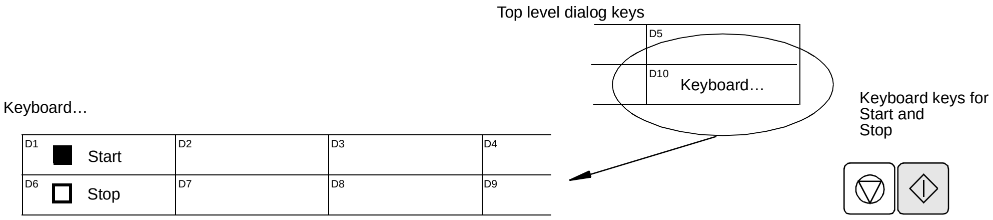


Figure 4-6. Start / Stop of Drive

4.3.3 Change of Setpoint

The setpoint value used in mode MAN and point of control CENTRAL or LOCAL is determined by the operator, provided that the source of setpoint is set to OPERATOR. It is always possible to preselect the setpoint even if the source of setpoint is set to EXTERNAL and use it later when the source of the setpoint is changed to OPERATOR.

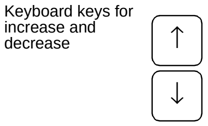


Figure 4-7. Keys for Change of Setpoint Value

With the increase and decrease keys, the value is changed in steps of 0.1%, if the shift key is pressed simultaneously the steps are 1.0%, provided that setpoint in % is chosen. The steps for setpoints in rpm are 1rpm or 10 rpm.

The setpoint and the output can of course also be altered via the dialog line input field, just like other numerical values.

4.3.4 Alarms

The alarms generated within DRICONE are treated in the standard way. For a description how group alarm is handled see *AdvaCommand Basic Functions, Users Guide Part 2(3).*
A complete list of the standard event texts for DRICONE is given in Appendix E, Standard Event Texts.

With the standard event handling, the alarms detected give standard property and event text, preceded by the object name and followed by the date and time. Other texts may be used, if non-standard event treatment pointer values have been selected (in the Event Treat part of the MMCX data base element).

The alarms in the object display are only available if only the main MMCX data base element is configured. Further alarms can be obtained if the fault MMCX and alarm data base element are configured.

All alarms also give red indication in the object display, to point out the cause.

You can reset the fault in the Drive by the choice "Order..." and the key Reset Fault, provided that the signal is implemented to be sent to the Drive and the drive is configured to reset fault from control system.

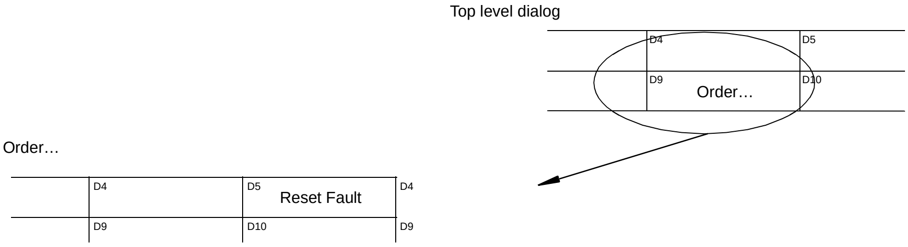


Figure 4-8. Reset of Fault

The operator can get further fault and alarm information by pressing the Diagnostic key in the top level dialog. An new dialog which enables the operator to call up overlapping fault and alarm displays see Figure 4-9. The Status/Limit push-button enables the operator to examine additional status from the drive. The display gives also detailed limit information.

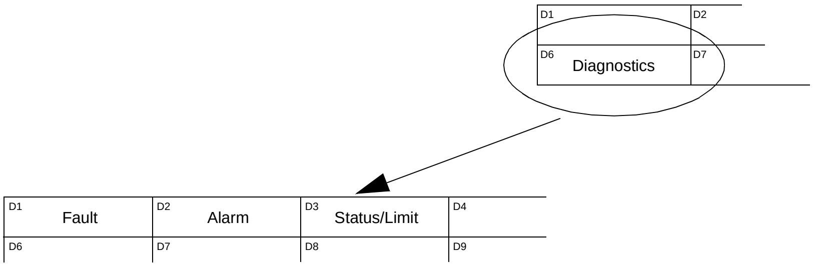


Figure 4-9. Diagnostic Dialog

Figure 4-10 shows the overlapping fault display for an ACS 600 with system application. See Chapter A.5, about the layout of a fault overlapping display for a DCS 500 or DCS 600 drive. Figure 4-11 shows the overlapping alarm display for an ACS 600 with system application. See Chapter A.6, about the layout of an alarm overlapping display for a DCS 500 or DCS 600 drives. Figure 4-12 shows the overlapping status/limit display for an ACS 600 with system application. There is no status/limit display for a DCS drive.

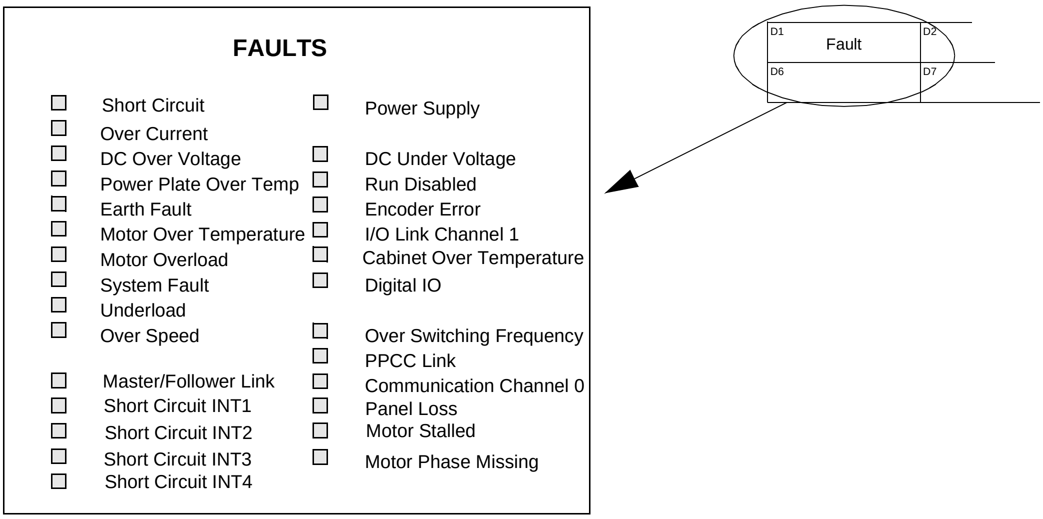


Figure 4-10. Fault Overlapping Display

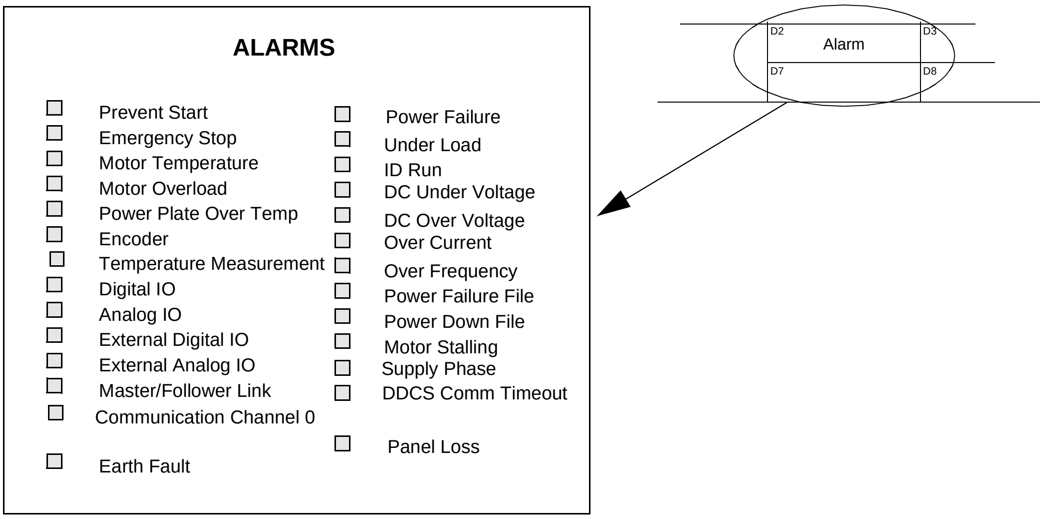
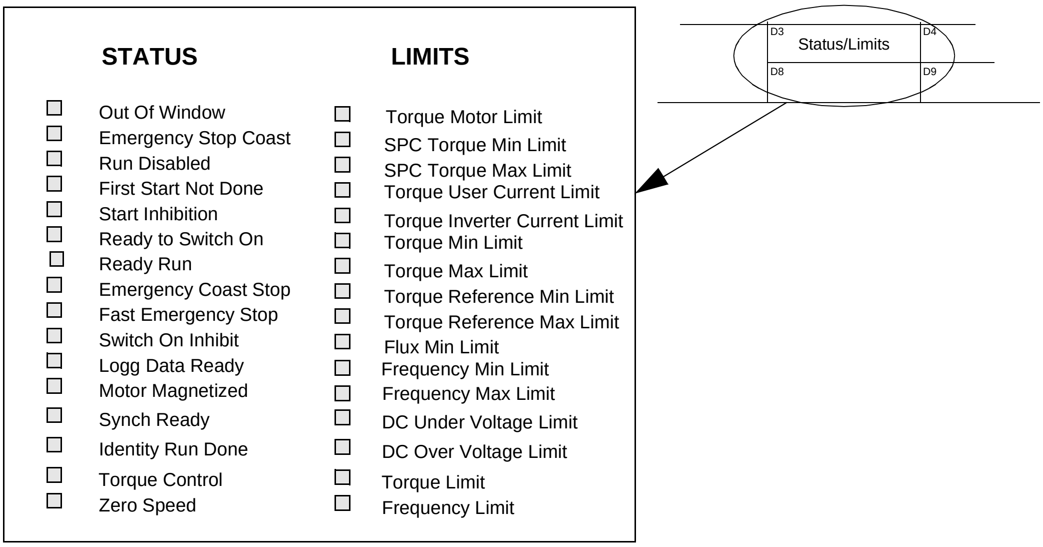


Figure 4-11. Alarm Overlapping Display



STATUS

- ☐ Out Of Window
- ☐ Emergency Stop Coast
- ☐ Run Disabled
- ☐ First Start Not Done
- ☐ Start Inhibition
- ☐ Ready to Switch On
- ☐ Ready Run
- ☐ Emergency Coast Stop
- ☐ Fast Emergency Stop
- ☐ Switch On Inhibit
- ☐ Logg Data Ready
- ☐ Motor Magnetized
- ☐ Synch Ready
- ☐ Identity Run Done
- ☐ Torque Control
- ☐ Zero Speed

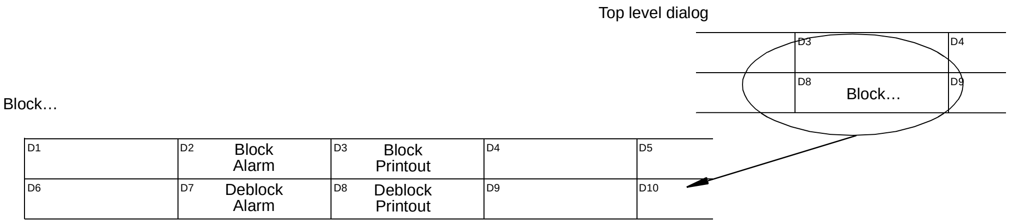
LIMITS

- ☐ Torque Motor Limit
- ☐ SPC Torque Min Limit
- ☐ SPC Torque Max Limit
- ☐ Torque User Current Limit
- ☐ Torque Inverter Current Limit
- ☐ Torque Min Limit
- ☐ Torque Max Limit
- ☐ Torque Reference Min Limit
- ☐ Torque Reference Max Limit
- ☐ Flux Min Limit
- ☐ Frequency Min Limit
- ☐ Frequency Max Limit
- ☐ DC Under Voltage Limit
- ☐ DC Over Voltage Limit
- ☐ Torque Limit
- ☐ Frequency Limit

Figure 4-12. Status/Limits Overlapping Display

4.3.5 Alarm Blocking

On maintenance level the dialog choice "Block..." allows the you to block alarms. The alarms presented in the object display and **not** the alarms in the diagnostic display are the only alarms which will be blocked.



D1	D2 Block Alarm	D3 Block Printout	D4	D5
D6	D7 Deblock Alarm	D8 Deblock Printout	D9	D10

Figure 4-13. Dialog Keys for Alarm Blocking

Besides this possibility for the operator to block alarms, blocking of alarms may be programmed as described in Section 3.1.15, Programmed Blocking of Alarms.

4.3.6 Change of Setpoint Source

The setpoint value can either be determined by the operator “Operator Setpoint” or determined by a PC program “External Setpoint”. The selection of the setpoint source are accessed via the top level dialog choice “Order...”. The setpoint value choice **not** at hand is shown with dimmed color in object, object close-up and group displays. Figure 4-3 shows an example in an object display where the setpoint source is operator controlled, the external setpoint is dimmed in this case.

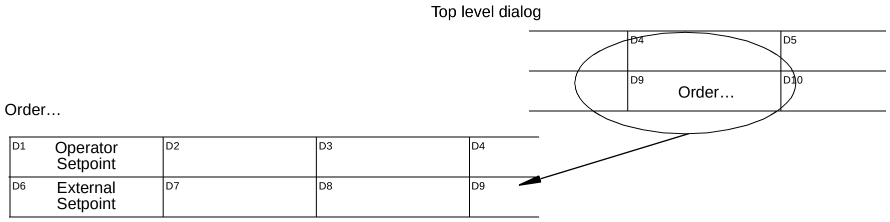


Figure 4-14. Change of Setpoint

4.3.7 Interlock and Interlock Override

Interlock prohibits start of the Drive and causes a running Drive to stop. All interlocks have distinct indications in the object display, thus making it very clear what the interlock is about. In other display element interlocks are indicated in the motor symbol and on the status line.

On maintenance level the dialog choice “Block...” and key Override Interlock allows you to override process interlock IB1 and IB3. The point of control JOG overrides all process interlocks IB1 - IB4 and sequence interlock IA. The letters BX are displayed in yellow if the interlocks are overridden. An active overridden interlock will have the letters BX in red.

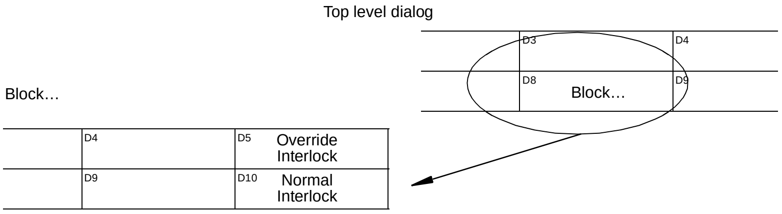


Figure 4-15. Dialog Keys for Interlock Override

4.4 Runtime Operation Menus

The dialogs used for manipulating the object are described in and in Section 4.3, Operating Instructions and in Appendix B, Process Dialog.

Chapter 5 Maintenance

5.1 Preventive Maintenance

Preventive maintenance is not really applicable to the software function DRICONE, except for assuring that the communication to the Drives are functioning properly. If communication error starts to appear in an application which has been running. The reason to the problem may be:

- Break in plastic fibre connecting the drives.
- Problem with a NAMC board in Drive within the ring.
- Problem with optical expansion unit TB810 or TB811.
- DDCS Branching Unit
- Problem in FCI.

5.2 Hardware Indicators

The hardware indicators Tx and Rx on TB810 or TB811 indicate communication status with drives on the optical ring see Figure 2-2. The following cases of indications on Tx and Rx can occur:

Turned off
No Drives are configured in AC 400. The IMPL input terminal on the DRIENG data base element is set to "0".

Pulsating with low frequency
No Drive in the ring is answering to the FCI. The light on Tx and Rx becomes steady on as soon as at least one Drive answers to the FCI.

Only Tx indicator
The FCI does not receive any data. The possible cause is a break in the optical ring.

Both Tx and Rx are on
At least one Drive exchanges dynamic data with the FCI.

The *S800 I/O User's guide* describes the hardware indicators on the FCI.

5.3 Error Messages

Communication error alarm indicates that something does not operate normally in the communication towards the Drive. Section 5.4, Fault Finding and User Repair explains causes and suggests counteractions.

5.4 Fault Finding and User Repair

This section aims at assisting you in finding the causes when you get in trouble and to give hints about suitable counteractions when that is appropriate.

5.4.1 Communication Error

If you get communication error, the following list may assist you in finding the reason of the problem and the possible counteraction.

Table 5-1. Troubleshooting List for Communication Error

Indications on DIAG output terminal on DRIENG	Cause and counteraction
No Configuration	The input terminal IMPL is still set to "0". The Drive module is still in its Not Configured State. • Set the IMPL and SERVICE input terminals to "1" The Drive module should now go to its Operational state.
Ready	The Drive does not leave the ready state because there is no CDP activated. • There is no PC-program made containing a DRI-S PC-element for the actual Drive module. • The PC-program accessing the Drive is put into build mode.
HW missing	The FCI does not communicate with the Drive. There may be several reasons for this. • The optical ring is broken. Check the hardware installation. • The address of the Drive does not agree with the address configured in the DRIENG DB-element. See Section 3.1.3, Addressing of Drive to get the correct match of address in Drive and DRIENG database element. • The baudrate of channel 0 is not set correctly in the Drive. Section 3.1.3, Addressing of Drive describes how the baudrate is set.
Wrong type	The actual module pointed out by the address in the DRIENG database element is not an engineered Drive. It may be a standard Drive or an I/O module. • Check the module pointed out by the address in the DRIENG database element.

5.4.2 Operator station problem

If you get problem with the DRICONE object in the operator station. The problem can be noticed as follow:

- No subscription data in object display.
- No DRICONE specific alarm and events.
- Log data for DRICONE cannot be configured or displayed in trend displays.

The cause for the problems above is that the RTA-board dump is from a previous operator station version. The correct counteraction is to run the appropriate upgrade script for the RTA-board after the user RTA backup is loaded. See the release note of the operator station about the location and the names of the upgrade scripts.

5.5 Backup/Restore Procedures

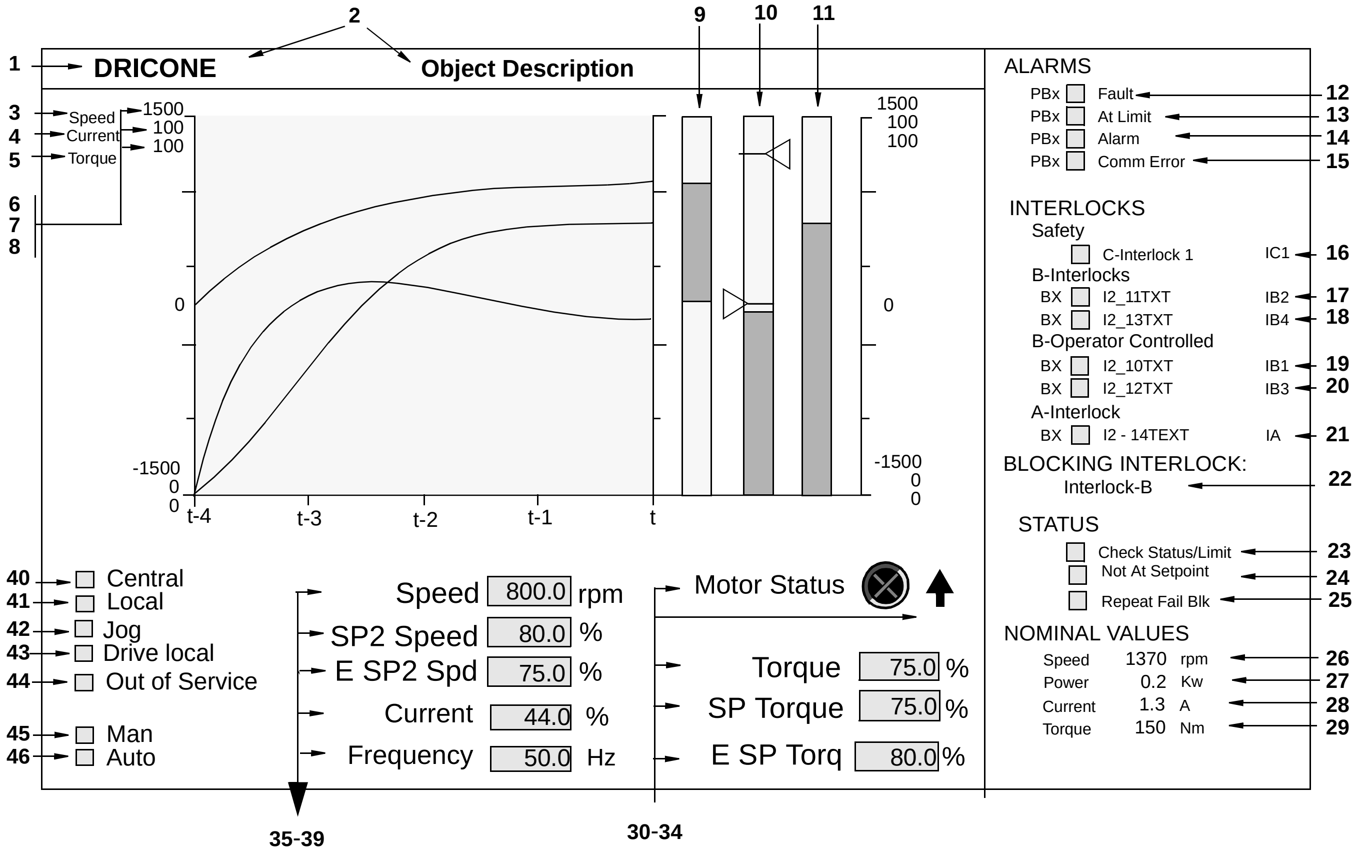
Backup of the DRICONE functionality in the controller is done with source code handling. The DRICONE functionality is also restored with source code handling.

Backup and restore of the Drive configuration in the AMC table is done with the Drive Window tool see *User's Manual Drives Window.*

Appendix A Display Elements

A.1 DRIEOB01

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Select Frame**	White	SELECTED = 1	*Object select frame*
		Black	-	
2	**Header**		NAME and DESCR	*Object name and description*
		Red flashing	AU_IND1_11 = 1 or AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_12 = 1	*Unacknowledged alarm*

No	Description	Presentation	Condition	Remarks
		Red	IND1_11 = 1 or IND1_07 = 1 or IND1_09 = 1 or IND1_12 = 1	*Fault* *Alarm* *Limit* *Communication error*
		Green		*Normal*
3.1	**Range Max Speed**	Green	REAL_C_MAX	
		-	INTWB_00 = 1	*Limit visible*
3.2	**Range Min Speed**	Green	REAL_C_MIN	
		-	INTWB_00 = 1	*Limit visible*
4.1	**Range Max Current**	Brown	REAL_RES_MAX	
		-	INTWB_01 = 1	*Limit visible*
4.2	**Range Min Current**	Brown	REAL_RES_MIN	
		-	INTWB_01 = 1	*Limit visible*
5.1	**Range Max Torque**	Magenta	REAL_A_MAX	
		-	INTWB_02 = 1	*Limit visible*
5.2	**Range Min Torque**	Magenta	REAL_A_MIN	
		-	INTWB_02 = 1	*Limit visible*
6	**Trim Curve Speed**	Green	REAL_C	*Trim curve for speed*
		-	INTWB_00 = 1	*Trim curve visible*
7	**Trim Curve Current**	Brown	REAL_RES	*Trim curve for current*
		-	INTWB_01 = 1	*Trim curve visible*
8	**Trim Curve Torque**	Magenta	REAL_A	*Trim curve for Torque*
		-	INTWB_02 = 1	*Trim Curve visible*
9.1	**Bar graph Speed**	Green	REAL_C	*Speed bar graph*
		Bar graph +	INTWB_00 = 1 and REAL_C REAL_C_MIN to REAL_C_MAX	*Bar graph when speed min value is positive.*
		Bar graph +/-	INTWB_00 = 1 and REAL_C_MIN<0 REAL_C -REAL_C_MAX to REAL_C_MAX	*Bar graph when speed min value is negative.*
10.1	**Bar graph Current**	Brown	REAL_RES	*Current bar graph*
		Bar graph +	INTWB_01 = 1 and REAL_RES REAL_RES_MIN to REAL_RES_MAX	*Bar graph when current min value is positive.*

No	Description	Presentation	Condition	Remarks
		Bar graph +/-	INTWB_01 = 1 and REAL_RES_MIN<0 REAL_RES -REAL_RES_MAX to REAL_RES_MAX	*Bar graph when current min value is negative.*
10.2	**Hi Load Indication**	at 100%	INTWB_01 = 1	*Limit Indication*
		Filled Yellow	ALARM_BLK=1 and REAL_RES > REAL_RES_HILIM or ALARM_PERIOD_BLK=1 and REAL_RES > REAL_RES_HILIM	*High load, Alarm blocked*
		Unfilled Yellow	ALARM_PERIOD_BLK=1 or ALARM_BLK = 1	*Alarm blocked*
		Filled Red	REAL_RES > REAL_RES_HILIM	*The value of current has passed the high load limit.*
		Unfilled, Grey		*Not high load*
		Grey		
10.3	**Normal Load Limit Indication**		INTWB_01 = 1	*Limit Visible for current only*
		Arrow (polygon)	at REAL_RES_LOLIM REAL_RES_MIN to REAL_RES_MAX	*Upper limit of normal load*
		Filled Yellow	AL_BLK=1 and REAL_RES > REAL_RES_LOLIM or AL_P_BLK=1 and REAL_RES > REAL_RES_LOLIM	*Above normal load, Alarm blocked*
		Unfilled Yellow	AL_P_BLK=1 or AL_BLK = 1	*Alarm blocked*
		Filled Grey	REAL_RES > REAL_RES_LOLIM	*The value of current has passed the normal load limit.*
		Unfilled, Grey		*Normal*
11.1	**Bar graph Torque**	Magenta	REAL_A	*Torque bar graph*
		Bar graph +	INTWB_02 = 1 and REAL_A REAL_A_MIN to REAL_A_MAX	*Bar graph when torque min value is positive.*
		Bar graph +/-	INTWB_02 = 1 and REAL_A_MIN<0 REAL_A -REAL_A_MAX to REAL_A_MAX	*Bar graph when torque min value is negative.*
12	**ALARMS**			*Alarms*
12.1	**Printout Blocked**	**P** Yellow	PRINT_BLK = 1	*Printout blocked*

No	Description	Presentation	Condition	Remarks
12.2	**Alarm Blocked**	**B** Yellow	ALARM_BLK = 1	*Alarm blocked by operator*
		Bx Yellow	ALARM_PERIOD_BLK = 1	*Alarm blocked by PC-program*
12.3	**Warning Indication**	■ Red flashing	AU_IND1_11 = 1	*Unacknowledged alarm*
		■ Red	IND1_11 = 1	*Alarm*
12.4	**Alarm 1 Text**	**Fault**		*NLS (Fault)*
		Red	IND1_11 = 1 or AU_IND1_11 = 1	
		Grey	-	
13.1	**Printout Blocked**	**P** Yellow	PRINT_BLK = 1	*Printout blocked*
13.2	**Alarm Blocked**	**B** Yellow	ALARM_BLK = 1	*Alarm blocked by operator*
		Bx Yellow	ALARM_PERIOD_BLK = 1	*Alarm blocked by PC-program*
13.3	**Warning Indication**	■ Red flashing	AU_IND1_09 = 1	*Unacknowledged alarm*
		■ Red	IND1_09 = 1	*Alarm*
13.4	**Alarm 2 Text**	**At Limit**		*NLS (At Limit)*
		Red	IND1_09 = 1 or AU_IND1_09 = 1	
		Grey	-	
14.1	**Printout Blocked**	**P** Yellow	PRINT_BLK = 1	*Printout blocked*
14.2	**Alarm Blocked**	**B** Yellow	ALARM_BLK = 1	*Alarm blocked by operator*
		Bx Yellow	ALARM_PERIOD_BLK = 1	*Alarm blocked by PC-program*
14.3	**Warning Indication**	■ Red flashing	AU_IND1_07 = 1	*Unacknowledged alarm*
		■ Red	IND1_07 = 1	*Alarm*
14.4	**Alarm 3 Text**	**Alarm**		*NLS (Alarm)*
		Red	IND1_07 = 1 or AU_IND1_07 = 1	
		Grey	-	
15.1	**Printout Blocked**	**P** Yellow	PRINT_BLK = 1	*Printout blocked*
15.2	**Alarm Blocked**	**B** Yellow	ALARM_BLK = 1	*Alarm blocked by operator*
		Bx Yellow	AL_PERIOD_BLK = 1	*Alarm blocked by PC-program*
15.3	**Warning Indication**	■ Red flashing	AU_IND1_12 = 1	*Unacknowledged alarm*
		■ Red	IND1_12 = 1	*Alarm*
15.4	**Alarm 4 Text**	**Comm. error**		*NLS (Comm. error)*
		Red	IND1_12 = 1 or AU_IND1_12 = 1	
		Grey	-	
16	**INTERLOCKS**			*Interlocks*
16	**STATUS**			*Status*

No	Description	Presentation	Condition	Remarks
16.1	**IC1 Active**	■ Yellow	IND2_08 = 1	*Safety Interlock IC1 active*
16.2	**IC1 Text**	**C-Interlock 1** Grey		*Safety Interlock IC1*
17.1	**IB2 Blocked**	**BX** Yellow	BOOL_C = 1	*Jog mode. Interlock blocked*
17.2	**IB2 Active**	■ Yellow	IND2_11 = 1	*Interlock IB2 active*
17.3	**IB2 Text**	Green	I2_11TXT	*Interlock IB2 text from database*
18.1	**IB4 Block Indication**	**BX** Yellow	BOOL_C = 1	*Jog mode. Interlock blocked*
		X Yellow	IND2_13 = 1 and IND2_02 = 1 and BOOL_F = 1	*Pending interlock, will be set when not running.*
18.2	**IB4 Active**	■ Yellow	(IND2_13 = 1 and BOOL_F = 0) or (IND2_13 = 1 and IND2_02 = 0 and BOOL_F = 1)	*Interlock IB4 active*
18.3	**IB4 Text**	Green	I2_13TXT	*Interlock IB4 text from database*
19.1	**IB1 Blocked**	**BX** Red	IND1_15 = 1	*Override Interlock and Interlock IB1 active*
		BX Yellow	(BOOL_C = 1 or IND2_15=1) and IND1_15=0	*Jog mode. Interlock blocked*
19.2	**IB1 Active**	■ Yellow	IND2_10 = 1 and IND2_15 = 0	*Interlock IB1 active*
19.3	**IB1 Text**	Green	I2_10TXT	*Interlock IB1 text from database*
20.1	**IB3 Blocked**	**BX** Red	IND1_15 = 1	*Override Interlock and Interlock IB3 active*
		BX Yellow	(BOOL_C = 1 or IND2_15=1) and IND1_15=0	*Jog mode. Interlock blocked*
		X Yellow	IND2_12 = 1 and IND2_02 = 1 and BOOL_F = 1 and IND2_15 = 0	*Pending interlock, will be set when not running.*
20.2	**IB3 Active**	■ Yellow	(IND2_12 = 1 and BOOL_F = 0 and IND2_15 = 0 and) or (IND2_12 = 1 and IND2_02 = 0 and BOOL_F = 1 and IND2_15 = 0)	*Interlock IB3 active*
20.3	**IB3 Text**	Green	I2_12TXT	*Interlock IB3 text from database*
21.1	**IA Blocked**	**BX** Yellow	BOOL_C = 1	*Jog mode. Interlock blocked*
21.2	**IA Active**	■ Yellow	IND2_14 = 1	*Interlock IA active*
21.3	**IA Text**	Green	I2_14TXT	*Interlock IA text from database*

No	Description	Presentation	Condition	Remarks
22	**Blocking Interlock**	Grey		*Blocking Interlock*
22.1	Blocking Interlock Text	Red	ACT_PRES_TEXT	*IC or IB1 - IB4 Interlocks are active.*
22.1	**Blocking Interlock Text**	Yellow	ACT_PRES_TEXT	*IA interlock is active.*
23.1	**Check Status/Limit Indication**	■ Green	BOOL_G = 1	
23.2	**Check Status/Limit Text**	**Check Status/Limit** Grey		*NLS (Check Status/Limit)*
24.1	**Not at setpoint Indication**	■ Green	IND2_02 = 1 and IND2_07 = 0	
24.2	**Not at reference Text**	**Not at Setpoint** Grey		*NLS (Not at Setpoint)*
25.1	**Repeat Fail Blocked Indication**	■ Yellow	REPEAT_BLK = 1	
25.2	**Repeat Fail Blocked Text**	**Repeat Fail Blk**		*NLS (Repeat Fail Blk)*
		Yellow	REPEAT_BLK = 1	
		Grey	-	
26	**Nominal Values**			*Nominal values*
26.1	**Nom. Speed Text**	**Nom. Speed** Grey		*NLS (Speed) Nominal Speed of drive*
26.2	**Nom. Speed Value**	Green	INTL_RES	
26.3	**Nom. Speed Unit**	**rpm** Grey	PRES_A[1..5]	*Unit rpm*
27.1	**Nom. Power Text**	**Nom. Power** Grey		*NLS (Power) Nominal Power of drive*
27.2	**Nom. Power Value**	Green	REAL_E from MMCX help object	
27.3	**Nom. Power Unit**	**kW** Grey		*Unit kW*
28.1	**Nom. Current Text**	**Nom. Current** Grey		*NLS (Current) Nominal Current of motor*
28.2	**Nom. Current Value**	Green	REAL_E_MIN from MMCX help object	
28.3	**Nom. Current Unit**	**A** Grey		*Unit Ampere*
29.1	**Nom. Torque Text**	**Nom. Torque** Grey		*NLS (Torque) Nominal Torque of motor*
29.2	**Nom. Torque Value**	Green	REAL_E_MAX from MMCX help object	
29.3	**Nom. Torque Unit**	**Nm** Grey		*Unit Nm*
30.1	**Motor Status Text**	**Motor Status** Grey		*Run*
30.2	**Motor Status**	Grey ⊗	IND2_00 = 0	*Out of service*

No	Description	Presentation	Condition	Remarks
		Green ⊗	IND2_01 = 0 or IND2_08 = 1 or IND2_10 = 1 or IND2_11 = 1 or IND2_12 = 1 or IND2_13 = 1 or	*Not Ready for Start* *Not Ready Run* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4*
		Green ⊘	IND2_14 = 1	*A - Interlock*
		Green ◉	IND2_02 = 1	*Drive running*
		Green ●	IND2_01 = 1	*Drive ready to start* *Ready Run*
		Medium Green (K5) (Centre part)	IND2_02 =1	*Running*
		Medium Green (K5), Light green (L5), Dark green (M5), Black (K16) (Centre part background)	All others except out of service	
31.1	**Dir/Speed Text**	**Dir/Speed** Grey		*Direction and speed*
31.2	**Direction Indication**	↑	IND2_02 = 1 and speed value positive	*Forward*
		↓	IND2_02 = 1 and speed value negative	*Reverse*
		⇧	IND2_01 = 1	*Run permitted*
		Green	-	
32.1	**Torque Text**	**Torque** Grey	INTWB_02 = 1	*NLS (Torque)*
32.2	**Torque Value**	Magenta	REAL_A	*Torque value*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*

No	Description	Presentation	Condition	Remarks
32.3	**Torque Unit**	**%** Magenta	-	*%*
33.1	**SP Torque Text**	**SP Torque** Grey	INTWB_14 = 1	*NLS (SP Torque)*
33.2	**SP Torque Value**	Cyan	REAL_PARAM and BOOL_E = 0	*Set point torque value*
		Grey	REAL_PARAM and BOOL_E = 1	When the E SP Torque set-point is selected
33.3	**SP Torque Unit**	**%** Cyan	BOOL_E = 0	*%*
		% Grey	BOOL_E = 1	When the E SP Torque set-point is selected
34.1	**E Sp Torq Text**	**E SP Torq** Grey	INTWB_14 = 1	*NLS (E SP Torq)*
34.2	**E Sp Torq Value**	Cyan	REAL_E and BOOL_E = 1	*External Set point torque value, value from PC-program*
		Grey	REAL_E and BOOL_E = 0	When the SP Torque setpoint is selected
34.3	**E Sp Torq Unit**	**%** Cyan	BOOL_E = 1	*%*
		% Grey	BOOL_E = 0	When the SP Torq setpoint is selected
35.1	**Speed Text**	**Speed** Grey	INTWB_00 = 1	*NLS (Speed)*
35.2	**Speed Value**	Green	REAL_C	*Motor speed*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
35.3	**Speed Unit**	Green	PRES_A (1-5)	*Unit of speed from MMCX database.*
36.1	**SP1 Speed Text**	**SP1 Speed** Grey	INTWB_11 = 1 and BOOL_E = 0	*NLS (SP Speed)*
		Grey	INTWB_11 = 1 and BOOL_E = 1	When the E SP Spd setpoint is selected
36.2	**SP1 Speed Value**	Cyan	REAL_PARAM and BOOL_E = 0 from drive help object	*Motor speed*
		Grey	REAL_PARAM and BOOL_E = 1 from drive help object	When the E SP Spd setpoint is selected
36.3	**SP1 Speed Unit**	**Unit** Cyan	PRES_A (1-5) and BOOL_E = 0	*Unit of SP Speed from MMCX database.*
		Unit Grey	PRES_A (1-5) and BOOL_E = 1	When the E SP Spd setpoint is selected

No	Description	Presentation	Condition	Remarks
36.1	**SP2 Speed Text**	**SP2 Speed** Grey	INTWB_12 = 1 and BOOL_E = 0	*NLS (SP Speed)*
		Grey	INTWB_12 = 1 and BOOL_E = 1	When the E SP Spd setpoint is selected
36.2	**SP2 Speed Value**	Cyan	REAL_PARAM and BOOL_E = 0	*Motor speed*
		Grey	REAL_PARAM and BOOL_E = 1	When the E SP Spd setpoint is selected
36.3	**SP2 Speed Unit**	**%** Cyan	BOOL_E = 0	*%*
		% Grey	BOOL_E = 1	When the E SP Spd setpoint is selected
37.1	**E SP1 Spd Text**	**E SP1 Spd** Grey	INTWB_11 = 1 and BOOL_E = 1	*NLS (E SP Spd)*
		Grey	INTWB_11 = 1 and BOOL_E = 0	When the SP Speed setpoint is selected
37.2	**E SP1 Spd Value**	Cyan	REAL_D and BOOL_E = 1 from drive help object	*External Set point speed value, value from PC-program*
		Grey	REAL_D and BOOL_E = 0 from drive help object	When the SP Speed setpoint is selected
37.3	**E SP1 Spd Unit**	**Unit** Cyan	PRES_A (1-5) and BOOL_E = 1	*Unit of SP Speed from MMCX database.*
		Unit Grey	PRES_A (1-5) and BOOL_E = 0	When the SP Speed setpoint is selected
37.1	**E SP2 Spd Text**	**E SP2 Spd** Grey	INTWB_12 = 1 and BOOL_E = 1	*NLS (E SP Spd)*
		Grey	INTWB_12 = 1 and BOOL_E = 0	When the SP Speed setpoint is selected
37.2	**E SP2 Spd Value**	Cyan	REAL_D and BOOL_E = 1	*External Set point speed value, value from PC-program*
		Grey	REAL_D and BOOL_E = 0	When the SP Speed setpoint is selected
37.3	**E SP2 Spd Unit**	**%** Cyan	BOOL_E = 1	*%*
		% Grey	BOOL_E = 0	When the SP Speed setpoint is selected
38.1	**Current Text**	**CURRENT** Grey	INTWB_01 = 1	*NLS (Current)*
38.2	**Current Value**	Brown	REAL_RES	*Current*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
38.3	**Current Unit**	**%** Brown	-	*% of nominal current*
39.1	**Value Text**	**"Value"** Grey	PRES_B and INTWB_03 = 1	Free text from MMCX db element, max 10 characters.

No	Description	Presentation	Condition	Remarks
39.2	**"Value" Value**	Light Yellow	REAL_B	
		? ? ?Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
39.3	**"Value" Unit**	Light Yellow	PRES_A [6..10]	*Free text, max 5 characters.*
40.1	**Central Indication**	■ Green	IND2_09 = 1 and BOOL_C = 0 and BOOL_D = 0	*Central Controlled* *from operator's place or by group start or other PC-program*
40.2	**Central Text**	**Central**		
		Green	IND2_09 = 1 and BOOL_C = 0 and BOOL_D = 0	*NLS (Central)*
		Grey	-	
41.1	**Local Indication**	■ Green	BOOL_D = 1 and IND2_09 = 1	*Local* *Controlled from local panel*
41.2	**Local Text**	**Local**		
		Green	BOOL_D = 1 and IND2_09 = 1	
		Grey	-	
42.1	**Jog Indication**	■ Yellow	BOOL_C = 1 and IND2_09 = 1	*Jog. Jog running from motor location*
42.2	**Jog Text**	**Jog**		
		Yellow	BOOL_C = 1 and IND2_09 = 1	*NLS (Jog)*
		Grey	-	
43.1	**Drive local Indication**	■ Yellow	IND2_09 = 0	*Local* *Controlled from local drive panel*
43.2	**Drive local Text**	**Drive local**		
		Yellow	IND2_09 = 0	*NLS (Drive local)*
		Grey	-	
44.1	**Out of Service Indication**	■ Yellow	IND2_00 = 0	*Out of service* *No control possible*
44.2	**Out of Service Text**	**Out of service**		
		Yellow	IND2_00 = 0	*NLS (Out of service)*
		Grey	-	
45.1	**Auto Indication**	■ Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	*Auto mode. Process conditions control start/stop of motor*

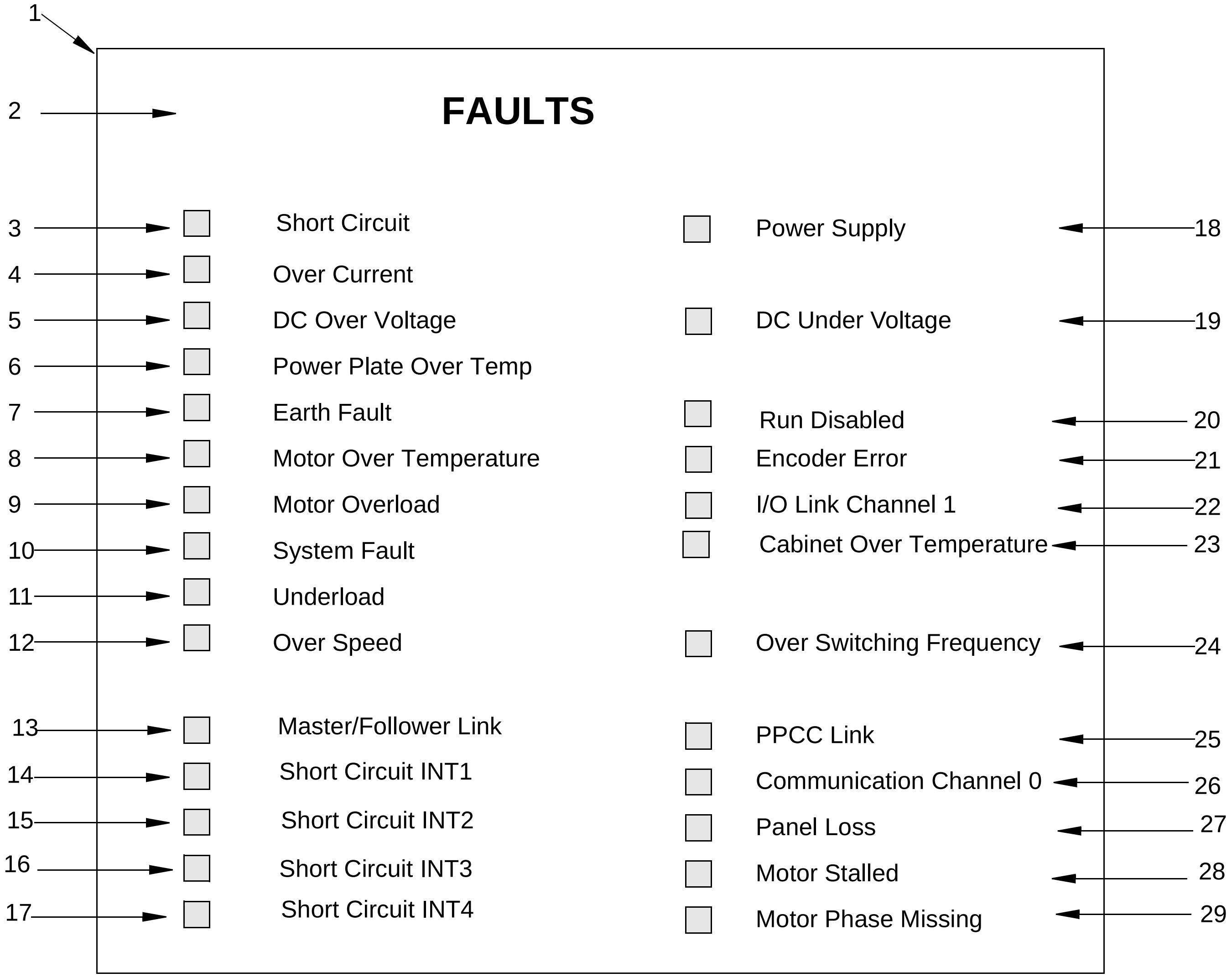
No	Description	Presentation	Condition	Remarks
45.2	**Auto Text**	**Auto**		
		Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	
		Grey	-	
46.1	**Man Indication**	■ Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	*Manual mode. Start order affects the motor directly*
46.2	**Ma**n Text	**Man** Grey		
		Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	
		Grey	-	

A.2 DRIEDIAG01

Data Base Element MMCX is to be named by the main Data Base Element + suffix <**.FL**>

Example: The main MMCX has the name **313-552A**. The MMCX for the fault overlap display should have the name **313-552A.FL**

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Frame**	Black	-	*No selection of frame. Remains on the main dialog.*
2	**Header**	Grey	Faults	*Faults title.*
3.1	**Short Circuit** **Fault**	■ Red flashing	AU_IND1_00 = 1	*Unacknowledged Alarm* *Short Circuit Fault*
3.2	**Short Circuit** **Fault**	■ Red	IND1_00 = 1	*Short Circuit Fault*
3.3	**Short Circuit Text** **Fault**	**Short Circuit** Red	AU_IND1_00 = 1 or IND1_00 = 1	*NLS (Short Circuit) fault.*
3.4	**Short Circuit Text** **Normal**	**Short Circuit** Grey	IND1_00 = 0	*NLS (Short Circuit) normal*
4.1	**Over Current** **Fault**	■ Red flashing	AU_IND1_01 = 1	*Unacknowledged Alarm* *Over Current Fault*
4.2	**Over Current** **Fault**	■ Red	IND1_01 = 1	*Over Current Fault*
4.3	**Over Current Text** **Fault**	**Over Current** Red	AU_IND1_01 = 1 or IND1_01 = 1	*NLS (Over Current) fault.*
4.4	**Over Current Text** **Normal**	**Over Current** Grey	IND1_01 = 0	*NLS (Over Current) normal*
5.1	**DC Over Voltage** **Fault**	■ Red flashing	AU_IND1_02 = 1	*Unacknowledged Alarm* *DC Over Voltage Fault*
5.2	**DC Over Voltage** **Fault**	■ Red	IND1_02 = 1	*DC Over Voltage Fault*
5.3	**DC Over Voltage Text** **Fault**	**DC Over Voltage** Red	AU_IND1_02 = 1 or IND1_02 = 1	*NLS (DC Over Voltage) fault.*
5.4	**DC Over Voltage Text** **Normal**	**DC Over Voltage** Grey	IND1_02 = 0	*NLS (DC Over Voltage) normal*
6.1	**Power Plate Over Temp** **Fault**	■ Red flashing	AU_IND1_03 = 1	*Unacknowledged Alarm* *Power Plate Over Temp*
6.2	**Power Plate Over Temp** **Fault**	■ Red	IND1_03 = 1	*Power Plate Over Temp*
6.3	**Power Plate Over Temp Text** **Fault**	**Power Plate Over Temp** Red	AU_IND1_03 = 1 or IND1_03 = 1	*NLS (Power Plate Over Temp) fault.*

No	Description	Presentation	Condition	Remarks
6.4	**Power Plate Over Temp Text** **Normal**	**Power Plate Over Temp** Grey	IND1_03 = 0	*NLS (Power Plate Over Temp) normal*
7.1	**Earth Fault** **Fault**	■ Red flashing	AU_IND1_04 = 1	*Unacknowledged Alarm* *Earth Fault*
7.2	**Earth Fault** **Fault**	■ Red	IND1_04 = 1	*Earth Fault*
7.3	**Earth Fault Text** **Fault**	**Earth Fault** Red	AU_IND1_04 = 1 or IND1_04 = 1	*NLS (Earth Fault) fault.*
7.4	**Earth Fault Text** **Normal**	**Earth Fault** Grey	IND1_04 = 0	*NLS (Earth Fault) normal*
8.1	**Motor Over Temperature** **Fault**	■ Red flashing	AU_IND1_05 = 1	*Unacknowledged Alarm* *Motor Over Temperature Fault*
8.2	**Motor Over Temperature** **Fault**	■ Red	IND1_05 = 1	*Motor Over Temperature Fault*
8.3	**Motor Over Temperature Text** **Fault**	**Motor Over Temperature** Red	AU_IND1_05 = 1 or IND1_05 = 1	*NLS (Motor Over Temperature) fault.*
8.4	**Motor Over Temperature Text** **Normal**	**Motor Over Temperature** Grey	IND1_05 = 0	*NLS (Motor Over Temperature) normal*
9.1	**Motor Overload** **Fault**	■ Red flashing	AU_IND1_06 = 1	*Unacknowledged Alarm* *Motor Overload Fault*
9.2	**Motor Overload** **Fault**	■ Red	IND1_06 = 1	*Motor Overload Fault*
9.3	**Motor Overload Text** **Fault**	**Motor Overload** Red	AU_IND1_06 = 1 or IND1_06 = 1	*NLS (Motor Overload) fault.*
9.4	**Motor Overload Text** **Normal**	**Motor Overload** Grey	IND1_06 = 0	*NLS (Motor Overload) normal*
10.1	**System Fault** **Fault**	■ Red flashing	AU_IND1_07 = 1	*Unacknowledged Alarm* *System Fault*
10.2	**System Fault** **Fault**	■ Red	IND1_07 = 1	*System Fault*
10.3	**System Fault Text** **Fault**	**System Fault** Red	AU_IND1_07 = 1 or IND1_07 = 1	*NLS (System Fault) fault.*
10.4	**System Fault Text** **Normal**	**System Fault** Grey	IND1_07 = 0	*NLS (System Fault) normal*
11.1	**Underload** **Fault**	■ Red flashing	AU_IND1_08 = 1	*Unacknowledged Alarm* *Underload Fault*

No	Description	Presentation	Condition	Remarks
11.2	**Underload** **Fault**	■ Red	IND1_08 = 1	*Underload Fault*
11.3	**Underload Text** **Fault**	**Underload** Red	AU_IND1_08 = 1 or IND1_08 = 1	*NLS (Underload) fault.*
11.4	**Underload Text** **Normal**	**Underload** Grey	IND1_08 = 0	*NLS (Underload) normal*
12.1	**Over Speed** **Fault**	■ Red flashing	AU_IND1_09 = 1	*Unacknowledged Alarm* *Over Speed Fault*
12.2	**Over Speed** **Fault**	■ Red	IND1_09 = 1	*Over Speed Fault*
12.3	**Over Speed Text** **Fault**	**Over Speed** Red	AU_IND1_09 = 1 or IND1_09 = 1	*NLS (Over Speed) fault.*
12.4	**Over Speed Text** **Normal**	**Over Speed** Grey	IND1_09 = 0	*NLS (Over Speed) normal*
13.1	**Master/Follower Link** **Fault**	■ Red flashing	AU_IND1_11 = 1	*Unacknowledged Alarm* *Master/Follower Link Fault*
13.2	**Master/Follower Link** **Fault**	■ Red	IND1_11 = 1	*Master/Follower Link Fault*
13.3	**Master/Follower Link Text** **Fault**	**Master/Follower Link** Red	AU_IND1_11 = 1 or IND1_11 = 1	*NLS (Master/Follower Link) fault.*
13.4	**Master/Follower Link Text** **Normal**	**Master/Follower Link** Grey	IND1_11 = 0	*NLS (Master/Follower Link) normal*
14.1	**Short Circuit INT1** **Fault**	■ Red flashing	AU_IND1_12 = 1	*Unacknowledged Alarm* *Short Circuit INT1 Fault*
14.2	**Short Circuit INT1** **Fault**	■ Red	IND1_12 = 1	*Short Circuit INT1 Fault*
14.3	**Short Circuit INT1 Text** **Fault**	**Short Circuit INT1** Red	AU_IND1_12 = 1 or IND1_12 = 1	*NLS (Short Circuit INT1) fault.*
14.4	**Short Circuit INT1 Text** **Normal**	**Short Circuit INT1** Grey	IND1_12= 0	*NLS (Short Circuit INT1) normal*
15.1	**Short Circuit INT2** **Fault**	■ Red flashing	AU_IND1_13 = 1	*Unacknowledged Alarm* *Short Circuit INT2 Fault*
15.2	**Short Circuit INT2** **Fault**	■ Red	IND1_13 = 1	*Short Circuit INT2 Fault*

No	Description	Presentation	Condition	Remarks
15.3	**Short Circuit INT2 Text Fault**	**Short Circuit INT2** Red	AU_IND1_13 = 1 or IND1_13 = 1	*NLS (Short Circuit INT2) fault.*
15.4	**Short Circuit INT2 Text Normal**	**Short Circuit INT2** Grey	IND1_13 = 0	*NLS (Short Circuit INT2) normal*
16.1	**Short Circuit INT3 Fault**	■ Red flashing	AU_IND1_14 = 1	*Unacknowledged Alarm* *Short Circuit INT3 Fault*
16.2	**Short Circuit INT3 Fault**	■ Red	IND1_14 = 1	*Short Circuit INT3 Fault*
16.3	**Short Circuit INT3 Text Fault**	**Short Circuit INT3** Red	AU_IND1_14 = 1 or IND1_14 = 1	*NLS (Short Circuit INT3) fault.*
16.4	**Short Circuit INT3 Text Normal**	**Short Circuit INT3** Grey	IND1_14 = 0	*NLS (Short Circuit INT3) normal*
17.1	**Short Circuit INT4 Fault**	■ Red flashing	AU_IND1_15 = 1	*Unacknowledged Alarm* *Short Circuit INT4 Fault*
17.2	**Short Circuit INT4 Fault**	■ Red	IND1_15 = 1	*Short Circuit INT4 Fault*
17.3	**Short Circuit INT4 Text Fault**	**Short Circuit INT4** Red	AU_IND1_15 = 1 or IND1_15 = 1	*NLS (Short Circuit INT4) fault.*
17.4	**Short Circuit INT4 Text Normal**	**Short Circuit INT4** Grey	IND1_15 = 0	*NLS (Short Circuit INT4) normal*
18.1	**Power Supply Fault**	■ Red flashing	AU_IND2_00 = 1	*Unacknowledged Alarm* *Start Inhibition Fault*
18.2	**Power Supply Fault**	■ Red	IND2_00 = 1	*Start Inhibition Fault*
18.3	**Power Supply Text Fault**	**Power Supply** Red	AU_IND2_00 = 1 or IND2_00 = 1	*NLS (Power Supply) Fault.*
18.4	**Power Supply Text Normal**	**Power Supply** Grey	IND2_00 = 0	*NLS (Power Supply) normal*
19.1	**DC Under Voltage Fault**	■ Red flashing	AU_IND2_02 = 1	*Unacknowledged Alarm* *DC Under Voltage Fault*
19.2	**DC Under Voltage Fault**	■ Red	IND2_02 = 1	*DC Under Voltage Fault*
19.3	**DC Under Voltage Text Fault**	**DC Under Voltage** Red	AU_IND2_02 = 1 or IND2_02 = 1	*NLS (DC Under Voltage) Fault.*
19.4	**DC Under Voltage Text Normal**	**DC Under Voltage** Grey	IND2_02 = 0	*NLS (DC Under Voltage) normal*
20.1	**Run Disabled Fault**	■ Red flashing	AU_IND2_04 = 1	*Unacknowledged Alarm* *Run Disabled*

No	Description	Presentation	Condition	Remarks
20.2	**Run Disabled** **Fault**	■ Red	IND2_04 = 1	*Run Disabled* *Fault*
20.3	**Run Disabled Text** **Fault**	**Run Disabled** Red	AU_IND2_04 = 1 or IND2_024= 1	*NLS (Run Disabled) Fault.*
20.4	**Run Disabled Text** **Normal**	**Run Disabled** Grey	IND2_04= 0	*NLS (Run Disabled) normal*
21.1	**Encoder Error** **Fault**	■ Red flashing	AU_IND2_05 = 1	*Unacknowledged Alarm* *Encoder Error Fault*
21.2	**Encoder Error** **Fault**	■ Red	IND2_05 = 1	*Encoder Error Fault*
21.3	**Encoder Error Text** **Fault**	**Encoder Error** Red	AU_IND2_05 = 1 or IND2_05 = 1	*NLS (Encoder Error) Fault.*
21.4	**Encoder Error Text** **Normal**	**Encoder Error** Grey	IND2_05 = 0	*NLS (Encoder Error) normal*
22.1	**I/O Link Channel 1** **Fault**	■ Red flashing	AU_IND2_06 = 1	*Unacknowledged Alarm* *I/O Link Channel 1 Fault*
22.2	**I/O Link Channel 1** **Fault**	■ Red	IND2_06 = 1	*I/O Link Channel 1 Fault*
22.3	**I/O Link Channel 1 Text** **Fault**	**I/O Link Channel 1** Red	AU_IND2_06 = 1 or IND2_06 = 1	*NLS (I/O Link Channel 1) Fault.*
22.4	**I/O Link Channel 1Text** **Normal**	**I/O Link Channel 1** Grey	IND2_06 = 0	*NLS (I/O Link Channel 1) normal*
23.1	**Cabinet Over Temperature** **Fault**	■ Red flashing	AU_IND2_07 = 1	*Unacknowledged Alarm* *Cabinet Over Temperature Fault*
23.2	**Cabinet Over Temperature** **Fault**	■ Red	IND2_07 = 1	*Cabinet Over Temperature Fault*
23.3	**Cabinet Over Temperature Text** **Fault**	**Cabinet Over Temperature** Red	AU_IND2_07 = 1 or IND2_07 = 1	*NLS (Cabinet Over Temperature) Fault.*
23.4	**Cabinet Over Temperature Text** **Normal**	**Cabinet Over Temperature** Grey	IND2_07 = 0	*NLS (Cabinet Over Temperature) normal*
24.1	**Over Switching Frequency** **Fault**	■ Red flashing	AU_IND2_09 = 1	*Over Switching Frequency Fault*
24.2	**Over Switching Frequency** **Fault**	■ Red	IND2_09 = 1	*Unacknowledged Alarm* *Over Switching Frequency Fault*

No	Description	Presentation	Condition	Remarks
24.3	**Over Switching Frequency Text** **Fault**	**Over Switching Frequency** Red	AU_IND2_09 = 1 or IND2_09 = 1	*NLS (Over Switching Frequency) Fault.*
24.4	**Over Switching Frequency Text** **Normal**	**Over Switching Frequency** Grey	IND2_09 = 0	*NLS (Over Switching Frequency) normal*
25.1	**PPCC Link** **Fault**	■ Red flashing	AU_IND2_11 = 1	*Unacknowledged Alarm* *PPCC Link Fault*
25.2	**PPCC Link** **Fault**	■ Red	IND2_11 = 1	*PPCC Link Fault*
25.3	**PPCC Link Text** **Fault**	**PPCC Link** Red	AU_IND2_11 = 1 or IND2_11 = 1	*NLS (PPCC Link) Fault.*
25.4	**PPCC Link Text** **Normal**	**PPCC Link** Grey	IND2_11 = 0	*NLS (PPCC Link) normal*
26.1	**Communication Channel 0** **Fault**	■ Red flashing	AU_IND2_12 = 1	*Unacknowledged Alarm* *Communication Channel 0 Fault*
26.2	**Communication Channel 0** **Fault**	■ Red	IND2_12 = 1	*Communication Channel 0 Fault*
26.3	**Communication Channel 0 Text** **Fault**	**Communication Channel 0** Red	AU_IND2_12 = 1 or IND2_12 = 1	*NLS (Communication Channel 0) Fault.*
26.4	**Communication Channel 0 Text** **Normal**	**Communication Channel 0** Grey	IND2_12 = 0	*NLS (Communication Channel 0) normal*
27.1	**Panel Loss** **Fault**	■ Red flashing	AU_IND2_13 = 1	*Unacknowledged Alarm* *Panel Loss Fault*
27.2	**Panel Loss** **Fault**	■ Red	IND2_13 = 1	*Panel Loss Fault*
27.3	**Panel Loss Text** **Fault**	**Panel Loss** Red	AU_IND2_13 = 1 or IND2_13 = 1	*NLS (Panel Loss) Fault.*
27.4	**Panel Loss Text** **Normal**	**Panel Loss** Grey	IND2_13 = 0	*NLS (Panel Loss) normal*
28.1	**Motor Stalled** **Fault**	■ Red flashing	AU_IND2_14 = 1	*Unacknowledged Alarm* *Motor Stalled Fault*
28.2	**Motor Stalled** **Fault**	■ Red	IND2_14 = 1	*Motor Stalled Fault*

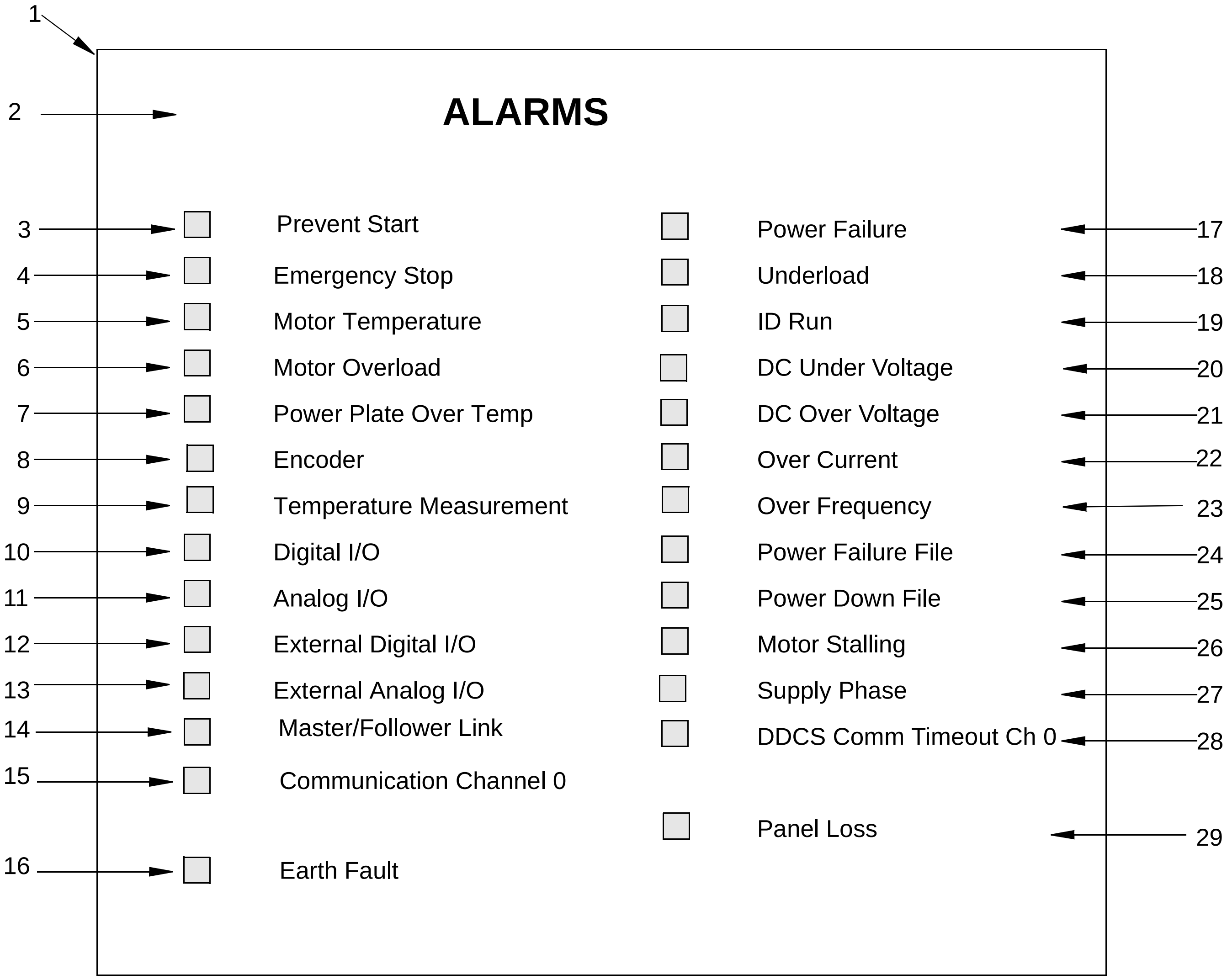
No	Description	Presentation	Condition	Remarks
28.3	**Motor Stalled Text** **Fault**	**Motor Stalled** Red	AU_IND2_14 = 1 or IND2_14 = 1	*NLS (Motor Stalled) Fault.*
28.4	**Motor Stalled Text** **Normal**	**Motor Stalled** Grey	IND2_14 = 0	*NLS (Motor Stalled) normal*
29.1	**Motor Phase Missing** **Fault**	■ Red flashing	AU_IND2_15 = 1	*Unacknowledged Alarm* *Motor Phase Missing Fault*
29.2	**Motor Phase Missing** **Fault**	■ Red	IND2_15 = 1	*Motor Phase Missing Fault*
29.3	**Motor Phase Missing Text** **Fault**	**Motor Phase Missing** Red	AU_IND2_15 = 1 or IND2_15 = 1	*NLS (Motor Phase Missing) Fault.*
29.4	**Motor Phase Missing Text** **Normal**	**Motor Phase Missing** Grey	IND2_15 = 0	*NLS (Motor Phase Missing) normal*

A.3 DRIEDIAG02

Data Base Element MMCX is to be named by the main Data Base Element + suffix <**.AL**>

Example: The main MMCX has the name **313-552A**. The MMCX for the fault overlap display should have the name **313-552A.AL**

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Frame**	Black	-	*No selection of frame. Remains on the main dialog.*
2	**Header**	Grey	Alarms	*Alarms title.*
3.1	**Prevent Start Alarm**	■ Red flashing	AU_IND1_00 = 1	*Unacknowledged Alarm* *Prevent Start Alarm*
3.2	**Prevent Start Alarm**	■ Red	IND1_00 = 1	*Prevent Start Alarm*
3.3	**Prevent Start Text Alarm**	**Prevent Start** Red	AU_IND1_00 = 1 or IND1_00 = 1	*NLS (Prevent Start) alarm.*
3.4	**Prevent Start Text Normal**	**Prevent Start** Grey	IND1_00 = 0	*NLS (Prevent Start) normal*
4.1	**Emergency Stop Alarm**	■ Red flashing	AU_IND1_01 = 1	*Unacknowledged Alarm* *Emergency Stop Alarm*
4.2	**Emergency Stop Alarm**	■ Red	IND1_01 = 1	*Emergency Stop Alarm*
4.3	**Emergency Stop Text Alarm**	**Emergency Stop** Red	AU_IND1_01 = 1 or IND1_01 = 1	*NLS (Emergency Stop) alarm.*
4.4	**Emergency Stop Text Normal**	**Emergency Stop** Grey	IND1_01 = 0	*NLS (Emergency Stop) normal*
5.1	**Motor Temperature Alarm**	■ Red flashing	AU_IND1_02 = 1	*Unacknowledged Alarm* *Motor Temperature Alarm*
5.2	**Motor Temperature Alarm**	■ Red	IND1_02 = 1	*Motor Temperature Alarm*
5.3	**Motor Temperature Text Alarm**	**Motor Temperature** Red	AU_IND1_02 = 1 or IND1_02 = 1	*NLS (Motor Temperature) alarm.*
5.4	**Motor Temperature Text Normal**	**Motor Temperature** Grey	IND1_02 = 0	*NLS (Motor Temperature) normal*
6.1	**Motor Overload Alarm**	■ Red flashing	AU_IND1_03 = 1	*Unacknowledged Alarm* *Motor Overload Alarm*
6.2	**Motor Overload Alarm**	■ Red	IND1_03 = 1	*Motor Overload Alarm*
6.3	**Motor Overload Text Alarm**	**Motor Overload** Red	AU_IND1_03 = 1 or IND1_03 = 1	*NLS (Motor Overload) alarm.*
6.4	**Motor Overload Text Normal**	**Motor Overload** Grey	IND1_03 = 0	*NLS (Motor Overload) normal*

No	Description	Presentation	Condition	Remarks
7.1	**Power Plate Over Temp** **Alarm**	■ Red flashing	AU_IND1_04 = 1	*Unacknowledged Alarm* *Power Plate Over Temp Alarm*
7.2	**Power Plate Over Temp** **Alarm**	■ Red	IND1_04 = 1	*Power Plate Over Temp Alarm*
7.3	**Power Plate Over Temp Text** **Alarm**	**Power Plate Over Temp** Red	AU_IND1_04 = 1 or IND1_04 = 1	*NLS (Power Plate Over Temp) alarm.*
7.4	**Power Plate Over Temp Text** **Normal**	**Power Plate Over Temp** Grey	IND1_04 = 0	*NLS (Power Plate Over Temp) normal*
8.1	**Encoder** **Alarm**	■ Red flashing	AU_IND1_05 = 1	*Unacknowledged Alarm* *Encoder Alarm*
8.2	**Encoder** **Alarm**	■ Red	IND1_05 = 1	*Encoder Alarm*
8.3	**Encoder Text** **Alarm**	**Encoder** Red	AU_IND1_05 = 1 or IND1_05 = 1	*NLS (Encoder) alarm.*
8.4	**Encoder Text** **Normal**	**Encoder** Grey	IND1_05 = 0	*NLS (Encoder) normal*
9.1	**Temperature Measurement** **Alarm**	■ Red flashing	AU_IND1_06 = 1	*Unacknowledged Alarm* *Temperature Measurement Alarm*
9.2	**Temperature Measurement** **Alarm**	■ Red	IND1_06 = 1	*Temperature Measurement Alarm*
9.3	**Temperature Measurement Text** **Alarm**	**Temperature Measurement** Red	AU_IND1_06 = 1 or IND1_06 = 1	*NLS (Temperature Measurement) alarm.*
9.4	**Temperature Measurement Text** **Normal**	**Temperature Measurement** Grey	IND1_06 = 0	*NLS (Temperature Measurement) normal*
10.1	**Digital I/O** **Alarm**	■ Red flashing	AU_IND1_07 = 1	*Unacknowledged Alarm* *Digital I/O Alarm*
10.2	**Digital I/O** **Alarm**	■ Red	IND1_07 = 1	*Digital I/O Alarm*
10.3	**Digital I/O Text** **Alarm**	**Digital I/O** Red	AU_IND1_07 = 1 or IND1_07 = 1	*NLS (Digital I/O) alarm.*
10.4	**Digital I/O Text** **Normal**	**Digital I/O** Grey	IND1_07 = 0	*NLS (Digital I/O) normal*

No	Description	Presentation	Condition	Remarks
11.1	**Analog I/O** **Alarm**	■ Red flashing	AU_IND1_08 = 1	*Unacknowledged Alarm* *Analog I/O Alarm*
11.2	**Analog I/O** **Alarm**	■ Red	IND1_08 = 1	*Analog I/O Alarm*
11.3	**Analog I/O Text** **Alarm**	**Analog I/O** Red	AU_IND1_08 = 1 or IND1_08 = 1	*NLS (Analog I/O) alarm.*
11.4	**Analog I/O Text** **Normal**	**Analog I/O** Grey	IND1_08 = 0	*NLS (Analog I/O) normal*
12.1	**External Digital I/O** **Alarm**	■ Red flashing	AU_IND1_09 = 1	*Unacknowledged Alarm* *External Digital I/O Alarm*
12.2	**External Digital I/O** **Alarm**	■ Red	IND1_09 = 1	*External Digital I/O Alarm*
12.3	**External Digital I/O Text** **Alarm**	**External Digital I/O** Red	AU_IND1_09 = 1 or IND1_09 = 1	*NLS (External Digital I/O) alarm.*
12.4	**External Digital I/O Text** **Normal**	**External Digital I/O** Grey	IND1_09 = 0	*NLS (External Digital I/O) normal*
13.1	**External Analog I/O** **Alarm**	■ Red flashing	AU_IND1_10 = 1	*Unacknowledged Alarm* *External Analog I/O Alarm*
13.2	**External Analog I/O** **Alarm**	■ Red	IND1_10 = 1	*External Analog I/O Alarm*
13.3	**External Analog I/O Text** **Alarm**	**External Analog I/O** Red	AU_IND1_10 = 1 or IND1_10 = 1	*NLS (External Analog I/O) alarm.*
13.4	**External Analog I/O Text** **Normal**	**External Analog I/O** Grey	IND1_10 = 0	*NLS (External Analog I/O) normal*
14.1	**Master Follower Link** **Alarm**	■ Red flashing	AU_IND1_11 = 1	*Unacknowledged Alarm* *Master Follower Link Alarm*
14.2	**Master Follower Link** **Alarm**	■ Red	IND1_11 = 1	*Master Follower Link Alarm*
14.3	**Master Follower Link Text** **Alarm**	**Master Follower Link** Red	AU_IND1_11 = 1 or IND1_11 = 1	*NLS (Master Follower Link) alarm.*
14.4	**Master Follower Link Text** **Normal**	**Master Follower Link** Grey	IND1_11 = 0	*NLS (Master Follower Link) normal*
15.1	**Communication Channel 0** **Fault**	■ Red flashing	AU_IND1_12 = 1	*Unacknowledged Alarm* *Communication Channel 0*

No	Description	Presentation	Condition	Remarks
15.2	**Communication Channel 0** **Fault**	■ Red	IND1_12 = 1	*Communication Channel 0*
15.3	**Communication Channel 0** **Fault**	**Communication Channel 0** Red	AU_IND1_12 = 1 or IND1_12 = 1	*NLS (Communication Channel 0) fault.*
15.4	**Communication Channel 0** **Normal**	**Communication Channel 0** Grey	IND1_12 = 0	*NLS (Communication Channel 0) normal*
16.1	**Earth Fault** **Fault**	■ Red flashing	AU_IND1_14 = 1	*Unacknowledged Alarm* *Earth Fault*
16.2	**Earth Fault** **Fault**	■ Red	IND1_14 = 1	*Earth Fault*
16.3	**Earth Fault** **Fault**	**Earth Fault** Red	AU_IND1_14 = 1 or IND1_14 = 1	*NLS (Earth Fault) fault.*
16.4	**Earth Fault** **Normal**	**Earth Fault** Grey	IND1_14 = 0	*NLS (Earth Fault) normal*
17.1	**Power Failure** **Fault**	■ Red flashing	AU_IND2_00 = 1	*Unacknowledged Alarm* *Power Failure*
17.2	**Power Failure** **Fault**	■ Red	IND2_00 = 1	*Power Failure*
17.3	**Power Failure Text** **Fault**	**Power Failure** Red	AU_IND2_00 = 1 or IND2_00 = 1	*NLS (Power Failure) fault.*
17.4	**Power Failure Text** **Normal**	**Power Failure** Grey	IND2_00 = 0	*NLS (Power Failure) normal*
18.1	**Underload** **Fault**	■ Red flashing	AU_IND2_01 = 1	*Unacknowledged Alarm* *Underload Fault*
18.2	**Underload** **Fault**	■ Red	IND2_01 = 1	*Underload Fault*
18.3	**Underload Text** **Fault**	**Underload** Red	AU_IND2_01 = 1 or IND2_01 = 1	*NLS (Underload) fault.*
18.4	**Underload Text** **Normal**	**Underload** Grey	IND2_01 = 0	*NLS (Underload) normal*
19.1	**ID Run** **Fault**	■ Red flashing	AU_IND2_02 = 1	*Unacknowledged Alarm* *ID Run Fault*
19.2	**ID Run** **Fault**	■ Red	IND2_02 = 1	*ID Run Fault*
19.3	**ID Run Text** **Fault**	**ID Run** Red	AU_IND2_02 = 1 or IND2_02 = 1	*NLS (ID Run) fault.*

No	Description	Presentation	Condition	Remarks
19.4	**ID Run Text** **Normal**	**ID Run** Grey	IND2_02 = 0	*NLS (ID Run) normal*
20.1	**DC Under Voltage** **Fault**	■ Red flashing	AU_IND2_03 = 1	*Unacknowledged Alarm* *DC Under Voltage Fault*
20.2	**DC Under Voltage** **Fault**	■ Red	IND2_03 = 1	*DC Under Voltage Fault*
20.3	**DC Under Voltage Text** **Fault**	**DC Under Voltage** Red	AU_IND2_03 = 1 or IND2_03 = 1	*NLS (DC Under Voltage) fault.*
20.4	**DC Under Voltage Text** **Normal**	**DC Under Voltage** Grey	IND2_03 = 0	*NLS (DC Under Voltage) normal*
21.1	**DC Over Voltage** **Fault**	■ Red flashing	AU_IND2_04 = 1	*Unacknowledged Alarm* *DC Over Voltage Fault*
21.2	**DC Over Voltage** **Fault**	■ Red	IND2_04 = 1	*DC Over Voltage Fault*
21.3	**DC Over Voltage Text** **Fault**	**DC Over Voltage** Red	AU_IND2_04 = 1 or IND2_04 = 1	*NLS (DC Over Voltage) fault.*
21.4	**DC Over Voltage Text** **Normal**	**DC Over Voltage** Grey	IND2_04 = 0	*NLS (DC Over Voltage) normal*
22.1	**Over Current** **Fault**	■ Red flashing	AU_IND2_05 = 1	*Unacknowledged Alarm* *Over Current Fault*
22.2	**Over Current** **Fault**	■ Red	IND2_05 = 1	*Over Current Fault*
22.3	**Over Current Text** **Fault**	**Over Current** Red	AU_IND2_05 = 1 or IND2_05 = 1	*NLS (Over Current) fault.*
22.4	**Over Current Text** **Normal**	**Over Current** Grey	IND2_05 = 0	*NLS (Over Current) normal*
23.1	**Over Frequency** **Fault**	■ Red flashing	AU_IND2_06 = 1	*Unacknowledged Alarm* *Over Frequency Fault*
23.2	**Over Frequency** **Fault**	■ Red	IND2_06 = 1	*Over Frequency Fault*
23.3	**Over Frequency Text** **Fault**	**Over Frequency** Red	AU_IND2_06 = 1 or IND2_06 = 1	*NLS (Over Frequency) fault.*
23.4	**Over Frequency Text** **Normal**	**Over Frequency** Grey	IND2_06 = 0	*NLS (Over Frequency) normal*
24.1	**Power Failure File** **Fault**	■ Red flashing	AU_IND2_07 = 1	*Unacknowledged Alarm* *Power Failure File Fault*
24.2	**Power Failure File** **Fault**	■ Red	IND2_07 = 1	*Power Failure File Fault*

No	Description	Presentation	Condition	Remarks
24.3	**Power Failure File Text** **Fault**	**Power Failure File** Red	AU_IND2_07 = 1 or IND2_07 = 1	*NLS (Power Failure File) fault.*
24.4	**Power Failure File Text** **Normal**	**Power Failure File** Grey	IND2_07 = 0	*NLS (Power Failure File) normal*
25.1	**Power Down File** **Fault**	■ Red flashing	AU_IND2_08 = 1	*Unacknowledged Alarm* *Power Down File Fault*
25.2	**Power Down File** **Fault**	■ Red	IND2_08 = 1	*Power Down File Fault*
25.3	**Power Down File Text** **Fault**	**Power Down File** Red	AU_IND2_08 = 1 or IND2_08 = 1	*NLS (Power Down File) fault.*
25.4	**Power Down File Text** **Normal**	**Power Down File** Grey	IND2_08 = 0	*NLS (Power Down File) normal*
26.1	**Motor Stalling** **Fault**	■ Red flashing	AU_IND2_09 = 1	*Unacknowledged Alarm* *Motor Stalling Fault*
26.2	**Motor Stalling** **Fault**	■ Red	IND2_09 = 1	*Motor Stalling Fault*
26.3	**Motor Stalling Text** **Fault**	**Motor Stalling** Red	AU_IND2_09 = 1 or IND2_09 = 1	*NLS (Motor Stalling) fault.*
26.4	**Motor Stalling Text** **Normal**	**Motor Stalling** Grey	IND2_09 = 0	*NLS (Motor Stalling) normal*
27.1	**Supply Phase** **Fault**	■ Red flashing	AU_IND2_10 = 1	*Unacknowledged Alarm* *Supply Phase Fault*
27.2	**Supply Phase** **Fault**	■ Red	IND2_10 = 1	*Supply Phase Fault*
27.3	**Supply Phase Text** **Fault**	**Supply Phase** Red	AU_IND2_10 = 1 or IND2_10 = 1	*NLS (Supply Phase) fault.*
27.4	**Supply Phase Text** **Normal**	**Supply Phase** Grey	IND2_10 = 0	*NLS (Supply Phase) normal*
28.1	**DDCS Comm Timeout Ch 0** **Fault**	■ Red flashing	AU_IND2_11 = 1	*Unacknowledged Alarm* *DDCS Comm Timeout Ch 0 Fault*

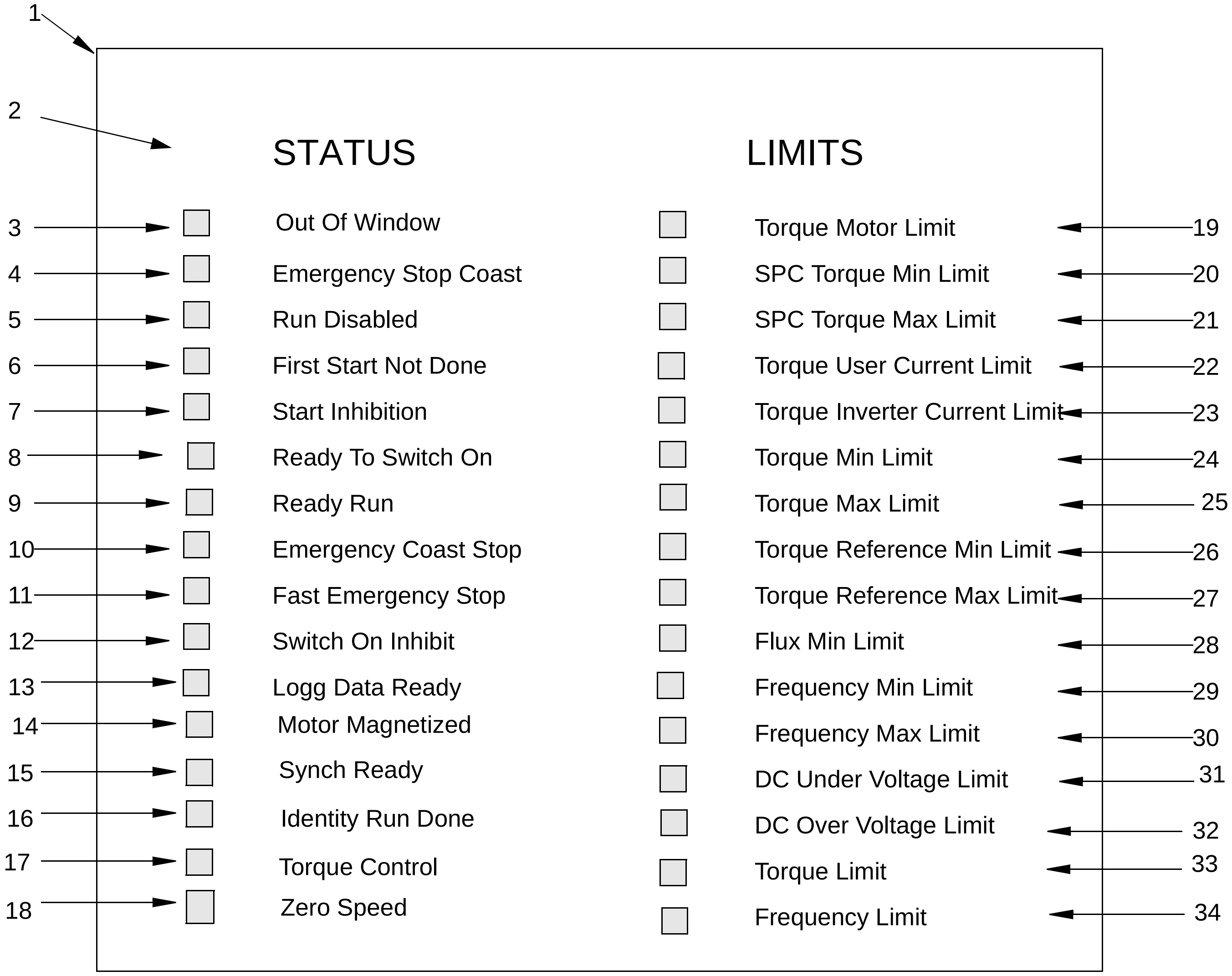
No	Description	Presentation	Condition	Remarks
28.2	**DDCS Comm Timeout Ch 0** **Fault**	■ Red	IND2_11 = 1	*DDCS Comm Timeout Ch 0 Fault*
28.3	**DDCS Comm Timeout Ch 0 Text** **Fault**	**DDCS Comm Timeout Ch 0** Red	AU_IND2_11 = 1 or IND2_11 = 1	*NLS (DDCS Comm Timeout Ch 0) fault.*
28.4	**DDCS Comm Timeout Ch 0 Text** **Normal**	**DDCS Comm Timeout Ch 0** Grey	IND2_11 = 0	*NLS (DDCS Comm Timeout Ch 0) normal*
29.1	**Panel Loss** **Alarm**	■ Red flashing	AU_IND2_13 = 1	*Unacknowledged Alarm* *Panel Loss Alarm*
29.2	**Panel Loss** **Alarm**	■ Red	IND2_13 = 1	*Panel Loss Alarm*
29.3	**Panel Loss Text** **Alarm**	**Panel Loss** Red	AU_IND2_13 = 1 or IND2_13 = 1	*NLS (Panel Loss) alarm.*
29.4	**Panel Loss Text** **Normal**	**Panel Loss** Grey	IND2_13 = 0	*NLS (Panel Loss) normal*

A.4 DRIEDIAG03

The status information to this diagnostic display comes from the main Data Base Element.Limits information is found in the faults Data Base Element MMCX + suffix <**.FL**>

Example: The main MMCX has the name **313-552A**. The MMCX for the fault overlap display should have the name **313-552A.FL**

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Frame**	Black	-	*No selection of frame. Remains on the main dialog.*
2	**Header**	Grey	Fault and Alarm	*Fault and Alarm title.*
3.1	**Out of Window Status**	■ Red flashing	AU_IND1_01 = 1	*Unacknowledged alarm Out of Window Status*
3.2	**Out of Window Status**	■ Red	IND1_01 = 1	*Out of Window Status*
3.3	**Out of Window Status**	**Out of Window** Red	AU_IND1_01 = 1 or IND1_01 = 1	*NLS (Out of Window) Status.*
3.4	**Out of Window Normal**	**Out of Window** Grey	IND1_01 = 0	*NLS (Out of Window) normal*
4.1	**Emergency Stop Coast Status**	■ Red flashing	AU_IND1_02 = 1	*Unacknowledged alarm Emergency Stop Coast Status*
4.2	**Emergency Stop Coast Status**	■ Red	IND1_02 = 1	*Emergency Stop Coast Status*
4.3	**Emergency Stop Coast Text Status**	**Emergency Stop Coast** Red	AU_IND1_02 = 1 or IND1_02 = 1	*NLS (Emergency Stop Coast) Status.*
4.4	**Emergency Stop Coast Text Normal**	**Emergency Stop Coast** Grey	IND1_02 = 0	*NLS (Emergency Stop Coast) normal*
5.1	**Run Disabled Status**	■ Red flashing	AU_IND1_04 = 1	*Unacknowledged alarm Run Disabled Status*
5.2	**Run Disabled Status**	■ Red	IND1_04 = 1	*Run Disabled Status*
5.3	**Run Disabled Text Status**	**Run Disabled** Red	AU_IND1_04 = 1 or IND1_04 = 1	*NLS (Run Disabled) Status.*
5.4	**Run Disabled Text Normal**	**Run Disabled** Grey	IND1_04 = 0	*NLS (Run Disabled) normal*
6.1	**First Start Not Done Status**	■ Red flashing	AU_IND1_06 = 1	*Unacknowledged alarm First Start Not Done Status*
6.2	**First Start Not Done Status**	■ Red	IND1_06 = 1	*First Start Not Done Status*
6.3	**First Start Not Done Text Status**	**First Start Not Done** Red	AU_IND1_06 = 1 or IND1_06 = 1	*NLS (First Start Not Done) Status.*

No	Description	Presentation	Condition	Remarks
6.4	**First Start Not Done Text** **Normal**	**First Start Not Done** Grey	IND1_06 = 0	*NLS (First Start Not Done) normal*
7.1	**Start Inhibition** **Status**	■ Red flashing	AU_IND1_08 = 1	*Unacknowledged alarm* *Start Inhibition Status*
7.2	**Start Inhibition** **Status**	■ Red	IND1_08 = 1	*Start Inhibition Status*
7.3	**Start Inhibition Text** **Status**	**Start Inhibition** Red	AU_IND1_08 = 1 or IND1_08 = 1	*NLS (Start Inhibition) Status.*
7.4	**Start Inhibition Text** **Normal**	**Start Inhibition** Grey	IND1_08 = 0	*NLS (Start Inhibition) normal*
8.1	**Ready To Switch On** **Status**	■ Green	IND2_00 = 1	*Ready To Switch On Status*
8.2	**Ready To Switch On Text** **Status**	**Ready To Switch On** Green	IND2_00 = 1	*NLS (Ready To Switch On) Status.*
8.3	**Ready To Switch On Text** **Normal**	**Ready To Switch On** Grey	IND2_00 = 0	*NLS (Ready To Switch On) normal*
9.1	**Ready Run** **Status**	■ Green	IND2_01 = 1	*Ready Run Status*
9.2	**Ready Run Text** **Status**	**Ready Run** Green	IND2_01 = 1	*NLS (Ready Run) Status.*
9.3	**Ready Run Text** **Normal**	**Ready Run** Grey	IND2_01 = 0	*NLS (Ready Run) normal*
10.1	**Emergency Coast Stop** **Status**	■ Red	IND2_04 = 1	*Emergency Coast Stop Status*
10.2	**Emergency Coast Stop Text** **Status**	**Emergency Coast Stop** Red	IND2_04 = 1	*NLS (Emergency Coast Stop) Status.*
10.3	**Emergency Coast Stop Text** **Normal**	**Emergency Coast Stop** Grey	IND2_04 = 0	*NLS (Emergency Coast Stop) normal*
11.1	**Fast Emergency Stop** **Status**	■ Red	IND2_05 = 1	*Fast Emergency Stop Status*
11.2	**Fast Emergency Stop Text** **Status**	**Fast Emergency Stop** Red	IND2_05 = 1	*NLS (Fast Emergency Stop) Status.*

No	Description	Presentation	Condition	Remarks
11.3	**Fast Emergency Stop Text** **Normal**	**Fast Emergency Stop** Grey	IND2_05 = 0	*NLS (Fast Emergency Stop) normal*
12.1	**Switch On Inhibit** **Status**	■ Red	IND2_06 = 1	*Switch On Inhibit Status*
12.2	**Switch On Inhibit Text** **Status**	**Switch On Inhibit** Red	IND2_06 = 1	*NLS (Switch On Inhibit) Status.*
12.3	**Switch On Inhibit Text** **Normal**	**Switch On Inhibit** Grey	IND2_06 = 0	*NLS (Switch On Inhibit) normal*
13.1	**Logg Data Ready** **Status**	■ Green	INTWB_00 = 1	*Logg Data Ready Status*
13.2	**Logg Data Ready Text** **Status**	**Logg Data Ready** Green	INTWB_00 = 1	*NLS (Logg Data Ready) Status.*
13.3	**Logg Data Ready Text** **Normal**	**Logg Data Ready** Grey	INTWB_00 = 0	*NLS (Logg Data Ready) normal*
14.1	**Motor Magnetized** **Status**	■ Green	INTWB_03 = 1	*Motor Magnetized Status*
14.2	**Motor Magnetized Text** **Status**	**Motor Magnetized** Green	INTWB_03 = 1	*NLS (Motor Magnetized) Status.*
14.3	**Motor Magnetized Text** **Normal**	**Motor Magnetized** Grey	INTWB_03 = 0	*NLS (Motor Magnetized) normal*
15.1	**Synch Ready** **Status**	■ Green	INTWB_05 = 1	*Synch Ready Status*
15.2	**Synch Ready Text** **Status**	**Synch Ready** Green	INTWB_05 = 1	*NLS (Synch Ready) Status.*
15.3	**Synch Ready Text** **Normal**	**Synch Ready** Grey	INTWB_05 = 0	*NLS (Synch Ready) normal*
16.1	**Identity Run Done** **Status**	■ Green	INTWB_07 = 1	*Identity Run Done Status*
16.2	**Identity Run Done Text** **Status**	**Identity Run Done** Green	INTWB_07 = 1	*NLS (Identity Run Done) Status.*
16.3	**Identity Run Done Text** **Normal**	**Identity Run Done** Grey	INTWB_07 = 0	*NLS (Identity Run Done) normal*
17.1	**Torque Control** **Status**	■ Green	INTWB_10 = 1	*Torque Control Status*

No	Description	Presentation	Condition	Remarks
17.2	**Torque Control Text** **Status**	**Torque Control** Green	INTWB_10 = 1	*NLS (Torque Control) Status.*
17.3	**Torque Control Text** **Normal**	**Torque Control** Grey	INTWB_10 = 0	*NLS (Torque Control) normal*
18.1	**Zero Speed** **Status**	■ Green	INTWB_11 = 1	*Zero Speed Status*
18.2	**Zero Speed Text** **Status**	**Zero Speed** Green	INTWB_11 = 1	*NLS (Zero Speed) Status.*
18.3	**Zero Speed Text** **Normal**	**Zero Speed** Grey	INTWB_11 = 0	*NLS (Zero Speed) normal*
19.1	**Torque Motor Limit** **Limit**	■ Red	INTWA_00 = 1	*Torque Motor Limit* *From MMCX.FL.*
19.2	**Torque Motor Limit Text** **Limit**	**Torque Motor Limit** Red	INTWA_00 = 1	*NLS (Torque Motor Limit) Limit.*
19.3	**Torque Motor Limit Text** **Normal**	**Torque Motor Limit** Grey	INTWA_00 = 0	*NLS (Torque Motor Limit) normal*
20.1	**SPC Torque Min Limit** **Limit**	■ Red	INTWA_01 = 1	*SPC Torque Min Limit* *From MMCX.FL.*
20.2	**SPC Torque Min Limit** **Limit**	**SPC Torque Min Limit** Red	INTWA_01 = 1	*NLS (SPC Torque Min Limit) Limit.*
20.3	**SPC Torque Min Limit** **Normal**	**SPC Torque Min Limit** Grey	INTWA_01 = 0	*NLS (SPC Torque Min Limit) normal*
21.1	**SPC Torque Max Limit** **Limit**	■ Red	INTWA_02 = 1	*SPC Torque Max Limit* *From MMCX.FL.*
21.2	**SPC Torque Max Limit Text** **Limit**	**SPC Torque Max Limit** Red	INTWA_02 = 1	*NLS (SPC Torque Max Limit) Limit.*
21.3	**SPC Torque Max Limit Text** **Normal**	**SPC Torque Max Limit** Grey	INTWA_02 = 0	*NLS (SPC Torque Max Limit) normal*
22.1	**Torque User Current Limit** **Limit**	■ Red	INTWA_03 = 1	*Torque User Current Limitation* *From MMCX.FL.*
22.2	**Torque User Current Limit Text** **Limit**	**Torque User Current Limit** Red	INTWA_03 = 1	*NLS (Torque User Current Limit) Limit.*

No	Description	Presentation	Condition	Remarks
22.3	**Torque User Current Limit Text** **Normal**	**Torque User Current Limit** Grey	INTWA_03 = 0	*NLS (Torque User Current Limit) normal*
23.1	**Torque Inverter Current Limit** **Limit**	■ Red	INTWA_04 = 1	*Torque Inverter Current Limit* *From MMCX.FL.*
23.2	**Torque Inverter Current Limit Text** **Limit**	**Torque Inverter Current Limit** Red	INTWA_04 = 1	*NLS (Torque Inverter Current Limit) Limit.*
23.3	**Torque Inverter Current Limit Text** **Normal**	**Torque Inverter Current Limit** Grey	INTWA_04 = 0	*NLS (Torque Inverter Current Limit) normal*
24.1	**Torque Min Limit** **Limit**	■ Red	INTWA_05 = 1	*Torque Min Limit* *From MMCX.FL.*
24.2	**Torque Min Limit Text** **Limit**	**Torque Min Limit** Red	INTWA_05 = 1	*NLS (Torque Min Limit) Limit.*
24.3	**Torque Min Limit Text** **Normal**	**Torque Min Limit** Grey	INTWA_05 = 0	*NLS (Torque Min Limit) normal*
25.1	**Torque Max Limit** **Limit**	■ Red	INTWA_06 = 1	*Torque Max Limit* *From MMCX.FL.*
25.2	**Torque Max Limit Text** **Limit**	**Torque Max Limit** Red	INTWA_06 = 1	*NLS (Torque Max Limit) Limit.*
25.3	**Torque Max Limit Text** **Normal**	**Torque Max Limit** Grey	INTWA_06 = 0	*NLS (Torque Max Limit) normal*
26.1	**Torque Reference Min Limit** **Limit**	■ Red	INTWA_07 = 1	*Torque Reference Min Limit* *From MMCX.FL.*
26.2	**Torque Reference Min Limit Text** **Limit**	**Torque Reference Min Limit** Red	INTWA_07 = 1	*NLS (Torque Reference Min Limit) Limit.*
26.3	**Torque Reference Min Limit Text** **Normal**	**Torque Reference Min Limit** Grey	INTWA_07 = 0	*NLS (Torque Reference Min Limit) normal*
27.1	**Torque Reference Max Limit** **Limit**	■ Red	INTWA_08 = 1	*Torque Reference Max Limit* *From MMCX.FL.*
27.2	**Torque Reference Max Limit Text** **Limit**	**Torque Reference Max Limit** Red	INTWA_08 = 1	*NLS (Torque Reference Max Limit) Limit.*

No	Description	Presentation	Condition	Remarks
27.3	**Torque Reference Max Limit Text** **Normal**	**Torque Reference Max Limit** Grey	INTWA_08 = 0	*NLS (Torque Reference Max Limit) normal*
28.1	**Flux Min Limit** **Limit**	■ Red	INTWA_09 = 1	*Flux Min Limit* *From MMCX.FL.*
28.2	**Flux Min Limit Text** **Limit**	**Flux Min Limit** Red	INTWA_09 = 1	*NLS (Flux Min Limit) Limit.*
28.3	**Flux Min Limit Text** **Normal**	**Flux Min Limit** Grey	INTWA_09 = 0	*NLS (Flux Min Limit) normal*
29.1	**Frequency Min Limit** **Limit**	■ Red	INTWA_10 = 1	*Frequency Min Limit* *From MMCX.FL.*
29.2	**Frequency Min Limit Text** **Limit**	**Frequency Min Limit** Red	INTWA_10 = 1	*NLS (Frequency Min Limit) Limit.*
29.3	**Frequency Min Limit Text** **Normal**	**Frequency Min Limit** Grey	INTWA_10 = 0	*NLS (Frequency Min Limit) normal*
30.1	**Frequency Max Limit** **Limit**	■ Red	INTWA_11 = 1	*Frequency Max Limit* *From MMCX.FL.*
30.2	**Frequency Max Limit Text** **Limit**	**Frequency Max Limit** Red	INTWA_11 = 1	*NLS (Frequency Max Limit) Limit.*
30.3	**Frequency Max Limit Text** **Normal**	**Frequency Max Limit** Grey	INTWA_11 = 0	*NLS (Frequency Max Limit) normal*
31.1	**DC Under Voltage Limit** **Limit**	■ Red	INTWA_12 = 1	*DC Under Voltage Limit* *From MMCX.FL.*
31.2	**DC Under Voltage Limit Text** **Limit**	**DC Under Voltage Limit** Red	INTWA_12 = 1	*NLS (DC Under Voltage Limit) Limit.*
31.3	**DC Under Voltage Limit Text** **Normal**	**DC Under Voltage Limit** Grey	INTWA_12 = 0	*NLS (DC Under Voltage Limit) normal*
32.1	**DC Over Voltage Limit** **Limit**	■ Red	INTWA_13 = 1	*DC Over Voltage Limit* *From MMCX.FL.*

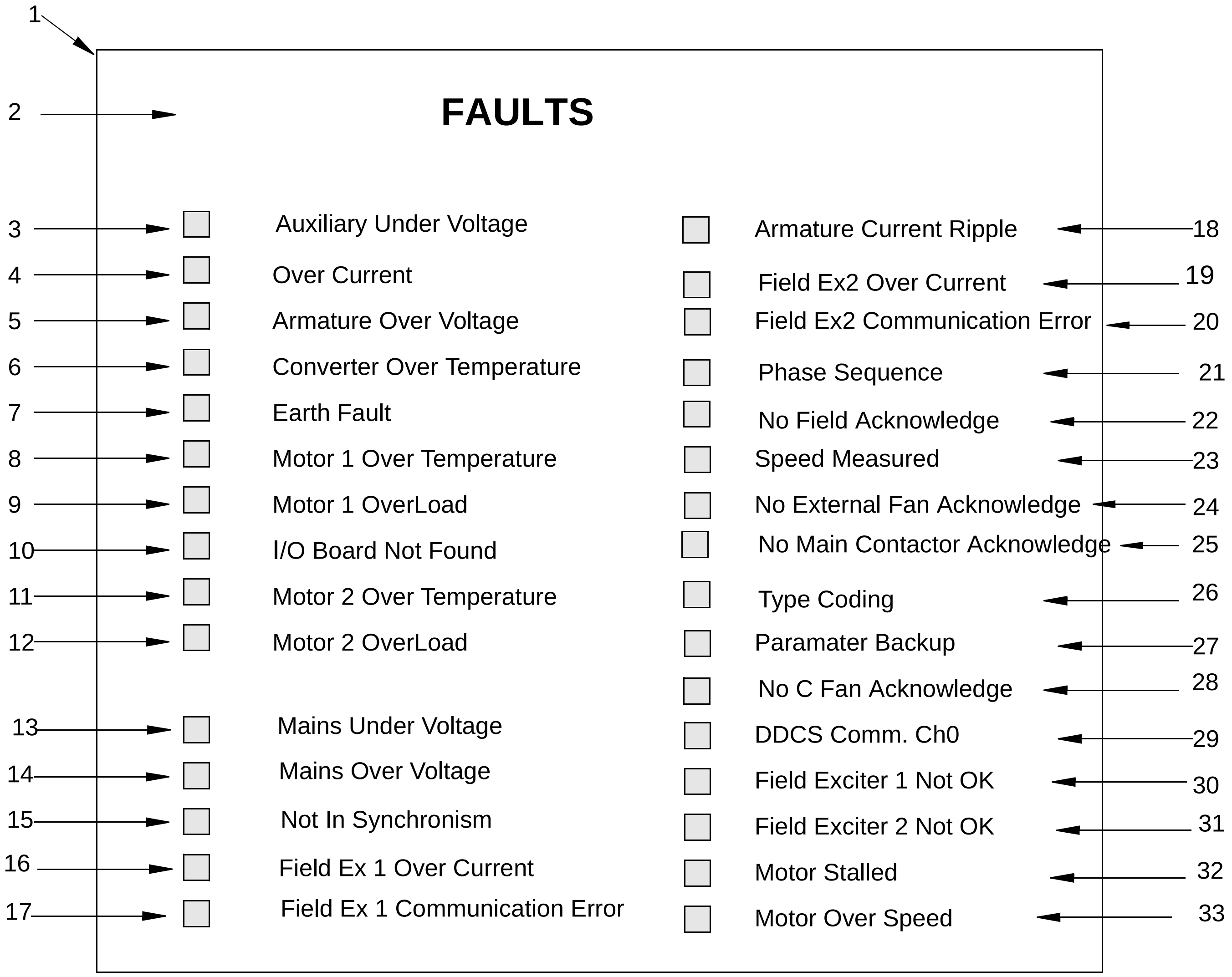
No	Description	Presentation	Condition	Remarks
32.2	**DC Over Voltage Limit Text** **Limit**	**DC Over Voltage Limit** Red	INTWA_13 = 1	*NLS (DC Over Voltage Limit) Limit.*
32.3	**DC Over Voltage Limit Text** **Normal**	**DC Over Voltage Limit** Grey	INTWA_13 = 0	*NLS (DC Over Voltage Limit) normal*
33.1	**Torque Limit** **Limit**	■ Red	INTWA_14 = 1	*Torque Limit* *From MMCX.FL.*
33.2	**Torque Limit Text** **Limit**	**Torque Limit** Red	INTWA_14 = 1	*NLS (Torque Limit) Limit.*
33.3	**Torque Limit Text** **Normal**	**Torque Limit** Grey	INTWA_14 = 0	*NLS (Torque Limit) normal*
34.1	**Frequency Limit** **Limit**	■ Red	INTWA_15 = 1	*Frequency Limit* *From MMCX.FL.*
34.2	**Frequency Limit Text** **Limit**	**Frequency Limit** Red	INTWA_15 = 1	*NLS (Frequency Limit) Limit.*
34.3	**Frequency Limit Text** **Normal**	**Frequency Limit** Grey	INTWA_15 = 0	*NLS (Frequency Limit) normal*

A.5 DRIEDIAG04

Data Base Element MMCX is to be named by the main Data Base Element + suffix <**.FL**>. This display is used when there is a DCS 500 or DCS 600 drive.

Example: The main MMCX has the name **313-552A**. The MMCX for the fault overlap display should have the name **313-552A.FL**

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Frame**	Black	-	*No selection of frame. Remains on the main dialog.*
2	**Header**	Grey	Faults	*Faults title.*
3.1	**Auxiliary Under Voltage** **Fault**	■ Red flashing	AU_IND1_00 = 1	*Unacknowledged Alarm* *Auxiliary Under Voltage Fault*
3.2	**Auxiliary Under Voltage** **Fault**	■ Red	IND1_00 = 1	*Auxiliary Under Voltage Fault*
3.3	**Auxiliary Under Voltage Text** **Fault**	**Auxiliary Under Voltage** Red	AU_IND1_00 = 1 or IND1_00 = 1	*NLS (Auxiliary Under Voltage) fault.*
3.4	**Auxiliary Under Voltage Text** **Normal**	**Auxiliary Under Voltage** Grey	IND1_00 = 0	*NLS (Auxiliary Under Voltage) normal*
4.1	**Over Current** **Fault**	■ Red flashing	AU_IND1_01 = 1	*Unacknowledged Alarm* *Over Current Fault*
4.2	**Over Current** **Fault**	■ Red	IND1_01 = 1	*Over Current Fault*
4.3	**Over Current Text** **Fault**	**Over Current** Red	AU_IND1_01 = 1 or IND1_01 = 1	*NLS (Over Current) fault.*
4.4	**Over Current Text** **Normal**	**Over Current** Grey	IND1_01 = 0	*NLS (Over Current) normal*
5.1	**Armature Over Voltage** **Fault**	■ Red flashing	AU_IND1_02 = 1	*Unacknowledged Alarm* *Armature Over Voltage Fault*
5.2	**Armature Over Voltage** **Fault**	■ Red	IND1_02 = 1	*Armature Over Voltage Fault*
5.3	**Armature Over Voltage Text** **Fault**	**Armature Over Voltage** Red	AU_IND1_02 = 1 or IND1_02 = 1	*NLS (Armature Over Voltage) fault.*
5.4	**Armature Over Voltage Text** **Normal**	**Armature Over Voltage** Grey	IND1_02 = 0	*NLS (Armature Over Voltage) normal*
6.1	**Converter Over Temperature** **Fault**	■ Red flashing	AU_IND1_03 = 1	*Unacknowledged Alarm* *Converter Over Temperature*
6.2	**Converter Over Temperature** **Fault**	■ Red	IND1_03 = 1	*Converter Over Temperature*

No	Description	Presentation	Condition	Remarks
6.3	**Converter Over Temperature Text** **Fault**	**Converter Over Temperature** Red	AU_IND1_03 = 1 or IND1_03 = 1	*NLS (Converter Over Temperature) fault.*
6.4	**Converter Over Temperature Text** **Normal**	**Converter Over Temperature** Grey	IND1_03 = 0	*NLS (Converter Over Temperature) normal*
7.1	**Earth Fault** **Fault**	■ Red flashing	AU_IND1_04 = 1	*Unacknowledged Alarm* *Earth Fault*
7.2	**Earth Fault** **Fault**	■ Red	IND1_04 = 1	*Earth Fault*
7.3	**Earth Fault Text** **Fault**	**Earth Fault** Red	AU_IND1_04 = 1 or IND1_04 = 1	*NLS (Earth Fault) fault.*
7.4	**Earth Fault Text** **Normal**	**Earth Fault** Grey	IND1_04 = 0	*NLS (Earth Fault) normal*
8.1	**Motor 1 Over Temperature** **Fault**	■ Red flashing	AU_IND1_05 = 1	*Unacknowledged Alarm* *Motor 1 Over Temperature Fault*
8.2	**Motor 1 Over Temperature** **Fault**	■ Red	IND1_05 = 1	*Motor 1 Over Temperature Fault*
8.3	**Motor 1 Over Temperature Text** **Fault**	**Motor 1 Over Temperature** Red	AU_IND1_05 = 1 or IND1_05 = 1	*NLS (Motor 1 Over Temperature) fault.*
8.4	**Motor 1 Over Temperature Text** **Normal**	**Motor 1 Over Temperature** Grey	IND1_05 = 0	*NLS (Motor 1 Over Temperature) normal*
9.1	**Motor 1 OverLoad** **Fault**	■ Red flashing	AU_IND1_06 = 1	*Unacknowledged Alarm* *Motor 1 OverLoad Fault*
9.2	**Motor 1 OverLoad** **Fault**	■ Red	IND1_06 = 1	*Motor 1 OverLoad Fault*
9.3	**Motor 1 OverLoad Text** **Fault**	**Motor 1 OverLoad** Red	AU_IND1_06 = 1 or IND1_06 = 1	*NLS (Motor 1 OverLoad) fault.*
9.4	**Motor 1 OverLoad Text** **Normal**	**Motor 1 OverLoad** Grey	IND1_06 = 0	*NLS (Motor 1 OverLoad) normal*
10.1	**I/O Board Not Found** **Fault**	■ Red flashing	AU_IND1_07 = 1	*Unacknowledged Alarm* *I/O Board Not Found*
10.2	**I/O Board Not Found** **Fault**	■ Red	IND1_07 = 1	*I/O Board Not Found*

No	Description	Presentation	Condition	Remarks
10.3	**I/O Board Not Found Text Fault**	**I/O Board Not Found** Red	AU_IND1_07 = 1 or IND1_07 = 1	*NLS (I/O Board Not Found) fault.*
10.4	**I/O Board Not Found Text Normal**	**I/O Board Not Found** Grey	IND1_07 = 0	*NLS (I/O Board Not Found) normal*
11.1	**Motor 2 Over Temperature Fault**	■ Red flashing	AU_IND1_08 = 1	*Unacknowledged Alarm* *Motor 2 Over Temperature Fault*
11.2	**Motor 2 Over Temperature Fault**	■ Red	IND1_08 = 1	*Motor 2 Over Temperature Fault*
11.3	**Motor 2 Over Temperature Text Fault**	**Motor 2 Over Temperature** Red	AU_IND1_08 = 1 or IND1_08 = 1	*NLS (Motor 2 Over Temperature) fault.*
11.4	**Motor 2 Over Temperature Text Normal**	**Motor 2 Over Temperature** Grey	IND1_08 = 0	*NLS (Motor 2 Over Temperature) normal*
12.1	**Motor 2 OverLoad Fault**	■ Red flashing	AU_IND1_09 = 1	*Unacknowledged Alarm* *Motor 2 OverLoad Fault*
12.2	**Motor 2 OverLoad Fault**	■ Red	IND1_09 = 1	*Motor 2 OverLoad Fault*
12.3	**Motor 2 OverLoad Text Fault**	**Motor 2 OverLoad** Red	AU_IND1_09 = 1 or IND1_09 = 1	*NLS (Motor 2 OverLoad) fault.*
12.4	**Motor 2 OverLoad Text Normal**	**Motor 2 OverLoad** Grey	IND1_09 = 0	*NLS (Motor 2 OverLoad) normal*
13.1	**Mains Under Voltage Fault**	■ Red flashing	AU_IND1_11 = 1	*Unacknowledged Alarm* *Mains Under Voltage Fault*
13.2	**Mains Under Voltage Fault**	■ Red	IND1_11 = 1	*Mains Under Voltage Fault*
13.3	**Mains Under Voltage Text Fault**	**Mains Under Voltage** Red	AU_IND1_11 = 1 or IND1_11 = 1	*NLS (Mains Under Voltage) fault.*
13.4	**Mains Under Voltage Text Normal**	**Mains Under Voltage** Grey	IND1_11 = 0	*NLS (Mains Under Voltage) normal*
14.1	**Mains Over Voltage Fault**	■ Red flashing	AU_IND1_12 = 1	*Unacknowledged Alarm* *Mains Over Voltage Fault*
14.2	**Mains Over Voltage Fault**	■ Red	IND1_12 = 1	*Mains Over Voltage Fault*
14.3	**Mains Over Voltage Text Fault**	**Mains Over Voltage** Red	AU_IND1_12 = 1 or IND1_12 = 1	*NLS (Mains Over Voltage) fault.*

No	Description	Presentation	Condition	Remarks
14.4	**Mains Over Voltage Text** **Normal**	**Mains Over Voltage** Grey	IND1_12= 0	*NLS (Mains Over Voltage) normal*
15.1	**Not In Synchronism** **Fault**	■ Red flashing	AU_IND1_13 = 1	*Unacknowledged Alarm* *Not In Synchronism Fault*
15.2	**Not In Synchronism** **Fault**	■ Red	IND1_13 = 1	*Not In Synchronism Fault*
15.3	**Not In Synchronism Text** **Fault**	**Not In Synchronism** Red	AU_IND1_13 = 1 or IND1_13 = 1	*NLS (Not In Synchronism) fault.*
15.4	**Not In Synchronism Text** **Normal**	**Not In Synchronism** Grey	IND1_13 = 0	*NLS (Not In Synchronism) normal*
16.1	**Field Ex 1 Over Current** **Fault**	■ Red flashing	AU_IND1_14 = 1	*Unacknowledged Alarm* *Field Ex 1 Over Current Fault*
16.2	**Field Ex 1 Over Current** **Fault**	■ Red	IND1_14 = 1	*Field Ex 1 Over Current Fault*
16.3	**Field Ex 1 Over Current Text** **Fault**	**Field Ex 1 Over Current** Red	AU_IND1_14 = 1 or IND1_14 = 1	*NLS (Field Ex 1 Over Current) fault.*
16.4	**Field Ex 1 Over Current Text** **Normal**	**Field Ex 1 Over Current** Grey	IND1_14 = 0	*NLS (Field Ex 1 Over Current) normal*
17.1	**Field Ex 1 Communication Error** **Fault**	■ Red flashing	AU_IND1_15 = 1	*Unacknowledged Alarm* *Field Ex 1 Communication Error Fault*
17.2	**Field Ex 1 Communication Error** **Fault**	■ Red	IND1_15 = 1	*Field Ex 1 Communication Error Fault*
17.3	**Field Ex 1 Communication Error Text** **Fault**	**Field Ex 1 Communication Error** Red	AU_IND1_15 = 1 or IND1_15 = 1	*NLS (Field Ex 1 Communication Error) fault.*
17.4	**Field Ex 1 Communication Error Text** **Normal**	**Field Ex 1 Communication Error** Grey	IND1_15 = 0	*NLS (Field Ex 1 Communication Error) normal*
18.1	**Armature Current Ripple Fault**	■ Red flashing	AU_IND2_00 = 1	*Unacknowledged Alarm* *Armature Current Ripple Fault*
18.2	**Armature Current Ripple Fault**	■ Red	IND2_00 = 1	*Armature Current Ripple Fault*
18.3	**Armature Current Ripple Text** **Fault**	**Armature Current Ripple** Red	AU_IND2_00 = 1 or IND2_00 = 1	*NLS (Armature Current Ripple) Fault.*

No	Description	Presentation	Condition	Remarks
18.4	**Armature Current Ripple Text** **Normal**	**Armature Current Ripple** Grey	IND2_00 = 0	*NLS (Armature Current Ripple) normal*
19.1	**Field Ex2 Over Current** **Fault**	■ Red flashing	AU_IND2_01 = 1	*Unacknowledged Alarm* *Field Ex2 Over Current Fault*
19.2	**Field Ex2 Over Current** **Fault**	■ Red	IND2_01 = 1	*Field Ex2 Over Current Fault*
19.3	**Field Ex2 Over Current Text** **Fault**	**Field Ex2 Over Current** Red	AU_IND2_01 = 1 or IND2_01 = 1	*NLS (Field Ex2 Over Current) Fault.*
19.4	**Field Ex2 Over Current Text** **Normal**	**Field Ex2 Over Current** Grey	IND2_01 = 0	*NLS (Field Ex2 Over Current) normal*
20.1	**Field Ex2 Communication Error** **Fault**	■ Red flashing	AU_IND2_02 = 1	*Unacknowledged Alarm* *Field Ex2 Communication Error*
20.2	**Field Ex2 Communication Error** **Fault**	■ Red	IND2_02 = 1	*Field Ex2 Communication Error* *Fault*
20.3	**Field Ex2 Communication Error Text** **Fault**	**Field Ex2 Communication Error** Red	AU_IND2_02 = 1 or IND2_02 = 1	*NLS (Field Ex2 Communication Error) Fault.*
20.4	**Field Ex2 Communication Error Text** **Normal**	**Field Ex2 Communication Error** Grey	IND2_02 = 0	*NLS (Field Ex2 Communication Error) normal*
21.1	**Phase Sequence** **Fault**	■ Red flashing	AU_IND2_03 = 1	*Unacknowledged Alarm* *Phase Sequence Fault*
21.2	**Phase Sequence** **Fault**	■ Red	IND2_03 = 1	*Phase Sequence Fault*
21.3	**Phase Sequence Text** **Fault**	**Phase Sequence** Red	AU_IND2_03 = 1 or IND2_05 = 1	*NLS (Phase Sequence) Fault.*
21.4	**Phase Sequence Text** **Normal**	**Phase Sequence** Grey	IND2_03 = 0	*NLS (Phase Sequence) normal*
22.1	**No Field Acknowledge** **Fault**	■ Red flashing	AU_IND2_04 = 1	*Unacknowledged Alarm* *No Field Acknowledge Fault*
22.2	**No Field Acknowledge** **Fault**	■ Red	IND2_04 = 1	*No Field Acknowledge Fault*
22.3	**No Field Acknowledge Text** **Fault**	**No Field Acknowledge** Red	AU_IND2_04 = 1 or IND2_04 = 1	*NLS (No Field Acknowledge) Fault.*

No	Description	Presentation	Condition	Remarks
22.4	**No Field AcknowledgeText** **Normal**	**No Field Acknowledge** Grey	IND2_04 = 0	*NLS (No Field Acknowledge) normal*
23.1	**Speed Measured** **Fault**	■ Red flashing	AU_IND2_05 = 1	*Unacknowledged Alarm* *Speed Measured Fault*
23.2	**Speed Measured** **Fault**	■ Red	IND2_05 = 1	*Speed Measured Fault*
23.3	**Speed Measured Text** **Fault**	**Speed Measured** Red	AU_IND2_05 = 1 or IND2_05 = 1	*NLS (Speed Measured) Fault.*
23.4	**Speed Measured Text** **Normal**	**Speed Measured** Grey	IND2_05 = 0	*NLS (Speed Measured) normal*
24.1	**No External Fan Acknowledge** **Fault**	■ Red flashing	AU_IND2_06 = 1	*No External Fan Acknowledge Fault*
24.2	**No External Fan Acknowledge** **Fault**	■ Red	IND2_06 = 1	*Unacknowledged Alarm* *No External Fan Acknowledge Fault*
24.3	**No External Fan Acknowledge Text** **Fault**	**No External Fan Acknowledge** Red	AU_IND2_06 = 1 or IND2_09 = 1	*NLS (No External Fan Acknowledge) Fault.*
24.4	**No External Fan Acknowledge Text** **Normal**	**No External Fan Acknowledge** Grey	IND2_06 = 0	*NLS (No External Fan Acknowledge) normal*
25.1	**No Main Contactor Acknowledge** **Fault**	■ Red flashing	AU_IND2_7 = 1	*Unacknowledged Alarm* *No Main Contactor Acknowledge Fault*
25.2	**No Main Contactor Acknowledge** **Fault**	■ Red	IND2_7 = 1	*No Main Contactor Acknowledge Fault*
25.3	**No Main Contactor Acknowledge Text** **Fault**	**No Main Contactor Acknowledge** Red	AU_IND2_7 = 1 or IND2_11 = 1	*NLS (No Main Contactor Acknowledge) Fault.*
25.4	**No Main Contactor Acknowledge Text** **Normal**	**No Main Contactor Acknowledge** Grey	IND2_7 = 0	*NLS (No Main Contactor Acknowledge) normal*
26.1	**Type Coding** **Fault**	■ Red flashing	AU_IND2_8 = 1	*Unacknowledged Alarm* *Type Coding Fault*
26.2	**Type Coding** **Fault**	■ Red	IND2_8 = 1	*Type Coding Fault*

No	Description	Presentation	Condition	Remarks
26.3	**Type Coding Text** **Fault**	**Type Coding** Red	AU_IND2_8 = 1 or IND2_8 = 1	*NLS (Type Coding) Fault.*
26.4	**Type Coding Text** **Normal**	**Type Coding** Grey	IND2_8 = 0	*NLS (Type Coding) normal*
27.1	**Paramater Backup** **Fault**	■ Red flashing	AU_IND2_9 = 1	*Unacknowledged Alarm* *Paramater Backup Fault*
27.2	**Paramater Backup** **Fault**	■ Red	IND2_9 = 1	*Paramater Backup Fault*
27.3	**Paramater Backup Text** **Fault**	**Paramater Backup** Red	AU_IND2_9 = 1 or IND2_9 = 1	*NLS (Paramater Backup) Fault.*
27.4	**Paramater Backup Text** **Normal**	**Paramater Backup** Grey	IND2_9 = 0	*NLS (Paramater Backup) normal*
28.1	**No C Fan Acknowledge** **Fault**	■ Red flashing	AU_IND2_10 = 1	*Unacknowledged Alarm* *No C Fan Acknowledge Fault*
28.2	**No C Fan Acknowledge** **Fault**	■ Red	IND2_10 = 1	*No C Fan Acknowledge Fault*
28.3	**No C Fan Acknowledge Text** **Fault**	**No C Fan Acknowledge** Red	AU_IND2_10 = 1 or IND2_10 = 1	*NLS (No C Fan Acknowledge) Fault.*
28.4	**No C Fan Acknowledge Text** **Normal**	**No C Fan Acknowledge** Grey	IND2_10 = 0	*NLS (No C Fan Acknowledge) normal*
29.1	**DDCS Comm. Ch0** **Fault**	■ Red flashing	AU_IND2_11 = 1	*Unacknowledged Alarm* *DDCS Comm. Ch0 Fault*
29.2	**DDCS Comm. Ch0** **Fault**	■ Red	IND2_11 = 1	*DDCS Comm. Ch0 Fault*
29.3	**DDCS Comm. Ch0 Text** **Fault**	**DDCS Comm. Ch0** Red	AU_IND2_11 = 1 or IND2_11 = 1	*NLS (DDCS Comm. Ch0) Fault.*
29.4	**DDCS Comm. Ch0 Text** **Normal**	**DDCS Comm. Ch0** Grey	IND2_11 = 0	*NLS (DDCS Comm. Ch0) normal*
30.1	**Field Exciter 1 Not OK** **Fault**	■ Red flashing	AU_IND2_12 = 1	*Unacknowledged Alarm* *Field Exciter 1 Not OK Fault*
30.2	**Field Exciter 1 Not OK** **Fault**	■ Red	IND2_12 = 1	*Field Exciter 1 Not OK Fault*
30.3	**Field Exciter 1 Not OK Text** **Fault**	**Field Exciter 1 Not OK** Red	AU_IND2_12 = 1 or IND2_13 = 1	*NLS (Field Exciter 1 Not OK) Fault.*

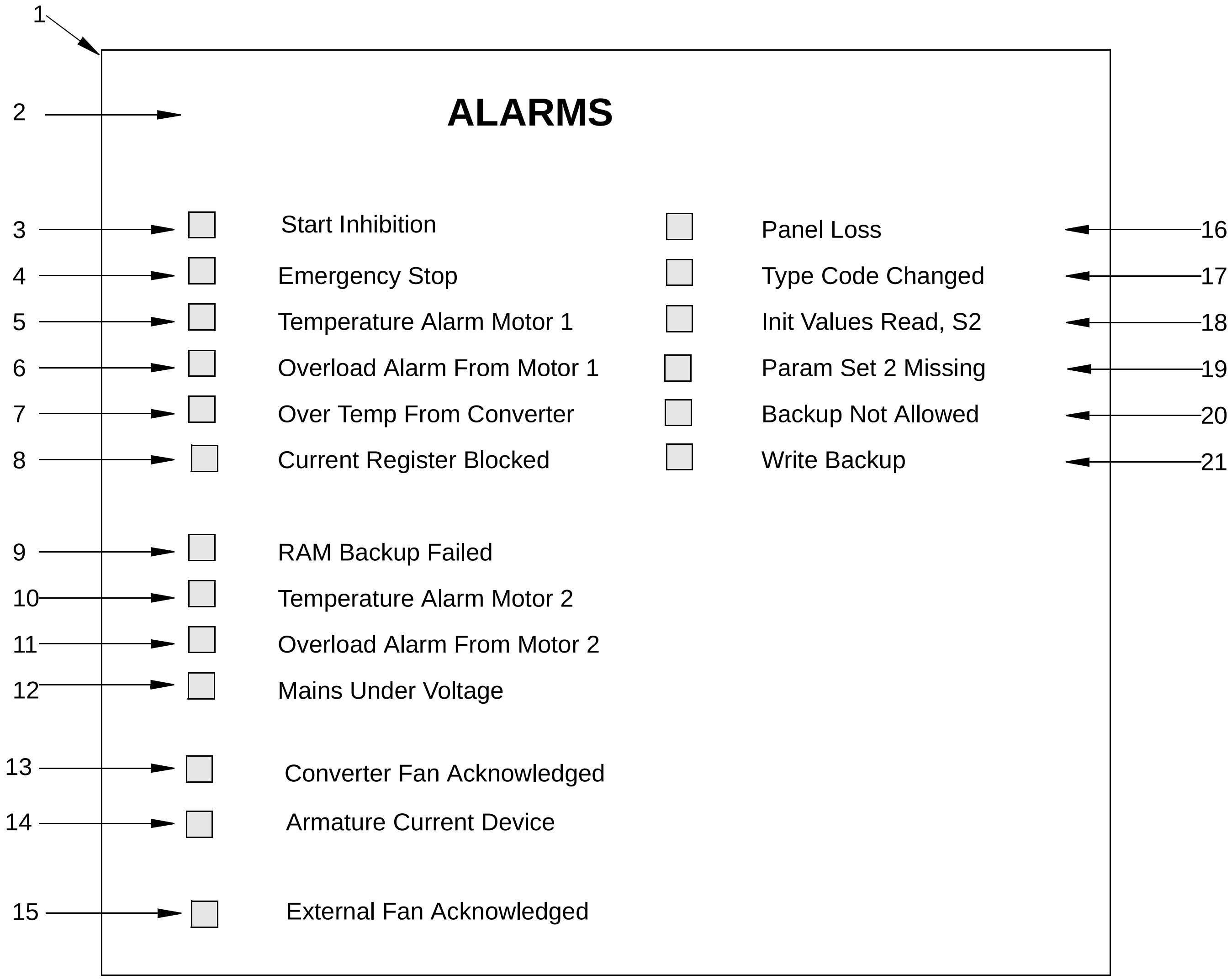
No	Description	Presentation	Condition	Remarks
30.4	**Field Exciter 1 Not OK Text** **Normal**	**Field Exciter 1 Not OK** Grey	IND2_12 = 0	*NLS (Field Exciter 1 Not OK) normal*
31.1	**Field Exciter 2 Not OK** **Fault**	■ Red flashing	AU_IND2_13 = 1	*Unacknowledged Alarm* *Field Exciter 2 Not OK Fault*
31.2	**Field Exciter 2 Not OK** **Fault**	■ Red	IND2_13 = 1	*Field Exciter 2 Not OK Fault*
31.3	**Field Exciter 2 Not OK Text** **Fault**	**Field Exciter 2 Not OK** Red	AU_IND2_13 = 1 or IND2_13 = 1	*NLS (Field Exciter 2 Not OK) Fault.*
31.4	**Field Exciter 2 Not OK Text** **Normal**	**Field Exciter 2 Not OK** Grey	IND2_13 = 0	*NLS (Field Exciter 2 Not OK) normal*
32.1	**Motor Stalled** **Fault**	■ Red flashing	AU_IND2_14 = 1	*Unacknowledged Alarm* *Motor Stalled Fault*
32.2	**Motor Stalled** **Fault**	■ Red	IND2_14 = 1	*Motor Stalled Fault*
32.3	**Motor Stalled Text** **Fault**	**Motor Stalled** Red	AU_IND2_14 = 1 or IND2_14 = 1	*NLS (Motor Stalled) Fault.*
32.4	**Motor Stalled Text** **Normal**	**Motor Stalled** Grey	IND2_14 = 0	*NLS (Motor Stalled) normal*
33.1	**Motor Over Speed** **Fault**	■ Red flashing	AU_IND2_15 = 1	*Unacknowledged Alarm* *Motor Over Speed Fault*
33.2	**Motor Over Speed** **Fault**	■ Red	IND2_15 = 1	*Motor Over Speed Fault*
33.3	**Motor Over Speed Text** **Fault**	**Motor Over Speed** Red	AU_IND2_15 = 1 or IND2_15 = 1	*NLS (Motor Over Speed) Fault.*
33.4	**Motor Over Speed Text** **Normal**	**Motor Over Speed** Grey	IND2_15 = 0	*NLS (Motor Over Speed) normal*

A.6 DRIEDIAG05

Data Base Element MMCX is to be named by the main Data Base Element + suffix <**.AL**>. This display is used when there is a DCS 500 or DCS 600 drive.

Example: The main MMCX has the name **313-552A**. The MMCX for the fault overlap display should have the name **313-552A.AL**

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Frame**	Black	-	*No selection of frame. Remains on the main dialog.*
2	**Header**	Grey	Alarms	*Alarms title.*
3.1	**Start Inhibition** **Alarm**	■ Red flashing	AU_IND1_00 = 1	*Unacknowledged Alarm* *Start InhibitionAlarm*
3.2	**Start Inhibition** **Alarm**	■ Red	IND1_00 = 1	*Start InhibitionAlarm*
3.3	**Start InhibitionText** **Alarm**	**Start Inhibition** Red	AU_IND1_00 = 1 or IND1_00 = 1	*NLS (Start Inhibition) alarm.*
3.4	**Start InhibitionText** **Normal**	**Start Inhibition** Grey	IND1_00 = 0	*NLS (Start Inhibition) normal*
4.1	**Emergency Stop** **Alarm**	■ Red flashing	AU_IND1_01 = 1	*Unacknowledged Alarm* *Emergency Stop Alarm*
4.2	**Emergency Stop** **Alarm**	■ Red	IND1_01 = 1	*Emergency Stop Alarm*
4.3	**Emergency Stop Text** **Alarm**	**Emergency Stop** Red	AU_IND1_01 = 1 or IND1_01 = 1	*NLS (Emergency Stop) alarm.*
4.4	**Emergency Stop Text** **Normal**	**Emergency Stop** Grey	IND1_01 = 0	*NLS (Emergency Stop) normal*
5.1	**Temperature Alarm Motor 1** **Alarm**	■ Red flashing	AU_IND1_02 = 1	*Unacknowledged Alarm* *Temperature Alarm Motor 1 Alarm*
5.2	**Temperature Alarm Motor 1** **Alarm**	■ Red	IND1_02 = 1	*Temperature Alarm Motor 1 Alarm*
5.3	**Temperature Alarm Motor 1 Text** **Alarm**	**Temperature Alarm Motor 1** Red	AU_IND1_02 = 1 or IND1_02 = 1	*NLS (Temperature Alarm Motor 1) alarm.*
5.4	**Temperature Alarm Motor 1 Text** **Normal**	**Temperature Alarm Motor 1** Grey	IND1_02 = 0	*NLS (Temperature Alarm Motor 1) normal*
6.1	**Overload Alarm From Motor 1** **Alarm**	■ Red flashing	AU_IND1_03 = 1	*Unacknowledged Alarm* *Overload Alarm From Motor 1 Alarm*
6.2	**Overload Alarm From Motor 1** **Alarm**	■ Red	IND1_03 = 1	*Overload Alarm From Motor 1 Alarm*

No	Description	Presentation	Condition	Remarks
6.3	**Overload Alarm From Motor 1 Text** **Alarm**	**Overload Alarm From Motor 1** Red	AU_IND1_03 = 1 or IND1_03 = 1	*NLS (Overload Alarm From Motor 1) alarm.*
6.4	**Overload Alarm From Motor 1 Text** **Normal**	**Overload Alarm From Motor 1** Grey	IND1_03 = 0	*NLS (Overload Alarm From Motor 1) normal*
7.1	**Over Temp From Converter** **Alarm**	■ Red flashing	AU_IND1_04 = 1	*Unacknowledged Alarm* *Over Temp From Converter Alarm*
7.2	**Over Temp From Converter** **Alarm**	■ Red	IND1_04 = 1	*Over Temp From Converter Alarm*
7.3	**Over Temp From Converter Text** **Alarm**	**Over Temp From Converter** Red	AU_IND1_04 = 1 or IND1_04 = 1	*NLS (Over Temp From Converter) alarm.*
7.4	**Over Temp From Converter Text** **Normal**	**Over Temp From Converter** Grey	IND1_04 = 0	*NLS (Over Temp From Converter) normal*
8.1	**Current Register Blocked** **Alarm**	■ Red flashing	AU_IND1_05 = 1	*Unacknowledged Alarm* *Current Register Blocked Alarm*
8.2	**Current Register Blocked** **Alarm**	■ Red	IND1_05 = 1	*Current Register Blocked Alarm*
8.3	**Current Register Blocked Text** **Alarm**	**Current Register Blocked** Red	AU_IND1_05 = 1 or IND1_05 = 1	*NLS (Current Register Blocked) alarm.*
8.4	**Current Register Blocked Text** **Normal**	**Current Register Blocked** Grey	IND1_05 = 0	*NLS (Current Register Blocked) normal*
9.1	**RAM Backup Failed** **Alarm**	■ Red flashing	AU_IND1_07 = 1	*Unacknowledged Alarm* *RAM Backup Failed Alarm*
9.2	**RAM Backup Failed** **Alarm**	■ Red	IND1_07 = 1	*RAM Backup Failed Alarm*
9.3	**RAM Backup Failed Text** **Alarm**	**RAM Backup Failed** Red	AU_IND1_07 = 1 or IND1_07 = 1	*NLS (RAM Backup Failed) alarm.*
9.4	**RAM Backup Failed Text** **Normal**	**RAM Backup Failed** Grey	IND1_07 = 0	*NLS (RAM Backup Failed) normal*
10.1	**Temperature Alarm Motor 2** **Alarm**	■ Red flashing	AU_IND1_08 = 1	*Unacknowledged Alarm* *Temperature Alarm Motor 2 Alarm*

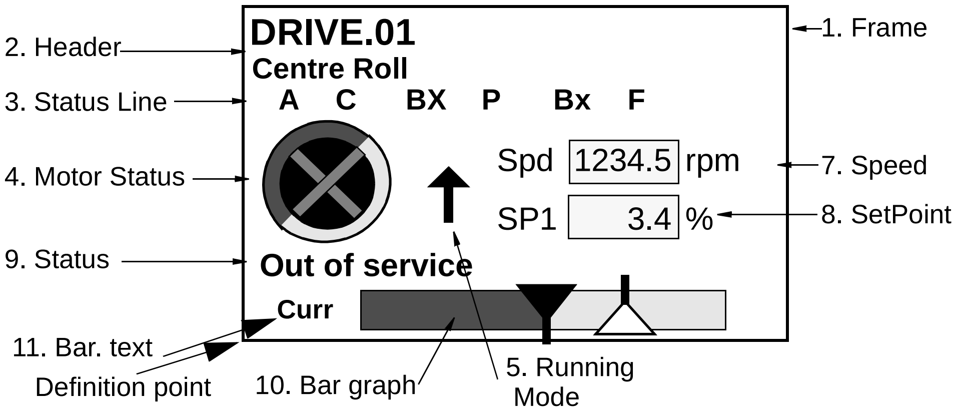
No	Description	Presentation	Condition	Remarks
10.2	**Temperature Alarm Motor 2** **Alarm**	■ Red	IND1_08 = 1	*Temperature Alarm Motor 2 Alarm*
10.3	**Temperature Alarm Motor 2 Text** **Alarm**	**Temperature Alarm Motor 2** Red	AU_IND1_08 = 1 or IND1_08 = 1	*NLS (Temperature Alarm Motor 2) alarm.*
10.4	**Temperature Alarm Motor 2 Text** **Normal**	**Temperature Alarm Motor 2** Grey	IND1_08 = 0	*NLS (Temperature Alarm Motor 2) normal*
11.1	**Overload Alarm From Motor 2** **Alarm**	■ Red flashing	AU_IND1_09 = 1	*Unacknowledged Alarm* *Overload Alarm From Motor 2 Alarm*
11.2	**Overload Alarm From Motor 2** **Alarm**	■ Red	IND1_09 = 1	*Overload Alarm From Motor 2 Alarm*
11.3	**Overload Alarm From Motor 2 Text** **Alarm**	**Overload Alarm From Motor 2** Red	AU_IND1_09 = 1 or IND1_09 = 1	*NLS (Overload Alarm From Motor 2) alarm.*
11.4	**Overload Alarm From Motor 2 Text** **Normal**	**Overload Alarm From Motor 2** Grey	IND1_09 = 0	*NLS (Overload Alarm From Motor 2) normal*
12.1	**Mains Under Voltage** **Alarm**	■ Red flashing	AU_IND1_10 = 1	*Unacknowledged Alarm* *Mains Under Voltage Alarm*
12.2	**Mains Under Voltage** **Alarm**	■ Red	IND1_10 = 1	*Mains Under Voltage Alarm*
12.3	**Mains Under Voltage Text** **Alarm**	**Mains Under Voltage** Red	AU_IND1_10 = 1 or IND1_10 = 1	*NLS (Mains Under Voltage) alarm.*
12.4	**Mains Under Voltage Text** **Normal**	**Mains Under Voltage** Grey	IND1_10 = 0	*NLS (Mains Under Voltage) normal*
13.1	**Converter Fan Acknowledged** **Alarm**	■ Red flashing	AU_IND1_12 = 1	*Unacknowledged Alarm* *Converter Fan Acknowledged Alarm*
13.2	**Converter Fan Acknowledged** **Alarm**	■ Red	IND1_12 = 1	*Converter Fan Acknowledged Alarm*
13.3	**Converter Fan Acknowledged Text** **Alarm**	**Converter Fan Acknowledged** Red	AU_IND1_12 = 1 or IND1_12 = 1	*NLS (Converter Fan Acknowledged) alarm.*
13.4	**Converter Fan Acknowledged Text** **Normal**	**Converter Fan Acknowledged** Grey	IND1_12 = 0	*NLS (Converter Fan Acknowledged) normal*

No	Description	Presentation	Condition	Remarks
14.1	**Armature Current Device** **Alarm**	■ Red flashing	AU_IND1_13 = 1	*Unacknowledged Alarm* *Armature Current Device Alarm*
14.2	**Armature Current Device** **Alarm**	■ Red	IND1_13 = 1	*Armature Current Device Alarm*
14.3	**Armature Current Device Text** **Alarm**	**Armature Current Device** Red	AU_IND1_13 = 1 or IND1_13 = 1	*NLS (Armature Current Device) alarm.*
14.4	**Armature Current Device Text** **Normal**	**Armature Current Device** Grey	IND1_13 = 0	*NLS (Armature Current Device) normal*
15.1	**External Fan Acknowledged** **Fault**	■ Red flashing	AU_IND1_15 = 1	*Unacknowledged Alarm* *External Fan Acknowledged*
15.2	**External Fan Acknowledged** **Fault**	■ Red	IND1_15 = 1	*External Fan Acknowledged*
15.3	**External Fan Acknowledged** **Fault**	**External Fan Acknowledged** Red	AU_IND1_15 = 1 or IND1_15 = 1	*NLS (External Fan Acknowledged) fault.*
15.4	**External Fan Acknowledged** **Normal**	**External Fan Acknowledged** Grey	IND1_15 = 0	*NLS (External Fan Acknowledged) normal*
16.1	**Panel Loss** **Fault**	■ Red flashing	AU_IND2_00 = 1	*Unacknowledged Alarm* *Panel Loss*
16.2	**Panel Loss** **Fault**	■ Red	IND2_00 = 1	*Panel Loss*
16.3	**Panel Loss Text** **Fault**	**Panel Loss** Red	AU_IND2_00 = 1 or IND2_00 = 1	*NLS (Panel Loss) fault.*
16.4	**Panel Loss Text** **Normal**	**Panel Loss** Grey	IND2_00 = 0	*NLS (Panel Loss) normal*
17.1	**Type Code Changed** **Fault**	■ Red flashing	AU_IND2_01 = 1	*Unacknowledged Alarm* *Type Code Changed Fault*
17.2	**Type Code Changed** **Fault**	■ Red	IND2_01 = 1	*Type Code Changed Fault*
17.3	**Type Code Changed Text** **Fault**	**Type Code Changed** Red	AU_IND2_01 = 1 or IND2_01 = 1	*NLS (Type Code Changed) fault.*
17.4	**Type Code Changed Text** **Normal**	**Type Code Changed** Grey	IND2_01 = 0	*NLS (Type Code Changed) normal*

No	Description	Presentation	Condition	Remarks
18.1	**Init Values Read, S2 Fault**	■ Red flashing	AU_IND2_02 = 1	*Unacknowledged Alarm* *Init Values Read, S2 Fault*
18.2	**Init Values Read, S2 Fault**	■ Red	IND2_02 = 1	*Init Values Read, S2 Fault*
18.3	**Init Values Read, S2 Text Fault**	**Init Values Read, S2** Red	AU_IND2_02 = 1 or IND2_02 = 1	*NLS (Init Values Read, S2) fault.*
18.4	**Init Values Read, S2 Text Normal**	**Init Values Read, S2** Grey	IND2_02 = 0	*NLS (Init Values Read, S2) normal*
19.1	**Param Set 2 Missing Fault**	■ Red flashing	AU_IND2_03 = 1	*Unacknowledged Alarm* *Param Set 2 Missing Fault*
19.2	**Param Set 2 Missing Fault**	■ Red	IND2_03 = 1	*Param Set 2 Missing Fault*
19.3	**Param Set 2 Missing Text Fault**	**Param Set 2 Missing** Red	AU_IND2_03 = 1 or IND2_03 = 1	*NLS (Param Set 2 Missing) fault.*
19.4	**Param Set 2 Missing Text Normal**	**Param Set 2 Missing** Grey	IND2_03 = 0	*NLS (Param Set 2 Missing) normal*
20.1	**Backup Not Allowed Fault**	■ Red flashing	AU_IND2_04 = 1	*Unacknowledged Alarm* *Backup Not Allowed Fault*
20.2	**Backup Not Allowed Fault**	■ Red	IND2_04 = 1	*Backup Not Allowed Fault*
20.3	**Backup Not Allowed Text Fault**	**Backup Not Allowed** Red	AU_IND2_04 = 1 or IND2_04 = 1	*NLS (Backup Not Allowed) fault.*
20.4	**Backup Not Allowed Text Normal**	**Backup Not Allowed** Grey	IND2_04 = 0	*NLS (Backup Not Allowed) normal*
21.1	**Write Backup Fault**	■ Red flashing	AU_IND2_05 = 1	*Unacknowledged Alarm* *Write Backup Fault*
21.2	**Write Backup Fault**	■ Red	IND2_05 = 1	*Write Backup Fault*
21.3	**Write Backup Text Fault**	**Write Backup** Red	AU_IND2_05 = 1 or IND2_05 = 1	*NLS (Write Backup) fault.*
21.4	**Write Backup Text Normal**	**Write Backup** Grey	IND2_05 = 0	*NLS (Write Backup) normal*

A.7 DRIEWI01

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Select Frame**	Rectangle		*The object select frame*
		White	SELECTED = 1	*Selected, Only for overlap*
		Black		
2.	**Header**	String (20)	NAME, DESCRIPTION	*Object name and description*
		Red Flash	AU_IND1_11 = 1 or AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_12 = 1	*Unacknowledged alarm*
		Red	IND1_11 = 1 or IND1_07 = 1 or IND1_09 = 1 or IND1_12 = 1	*Fault* *Alarm* *Limit* *Communication error*
		Green		
3.	**Status Line**			
3.1	**Mode**	**M** Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	*NLS (Man)*
		A Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	*NLS (Auto)*
3.2	**Point of Control**	**O** Yellow	IND2_00 = 0	*NLS (Out of service)*
		D Yellow	IND2_09 = 0	*NLS (Drive local)*

No	Description	Presentation	Condition	Remarks
		J Yellow	BOOL_C = 1 and IND2_09 = 1	*NLS (Jog)*
		L Green	BOOL_D = 1 and IND2_09 = 1	*NLS (Local)*
		C Green	BOOL_C = 0 and BOOL_D = 0 and IND2_09 = 1	*NLS (Central)*
3.3	**Interlock indications**	**X** Yellow	(IND2_12 = 1 and IND2_02 = 1 and BOOL_F = 1 and IND2_15 = 0) or (IND2_13 = 1 and IND2_02 = 1 and BOOL_F = 1)	*B- Interlock 3* *B - Interlock 4*
		X Green	(IND2_08 = 1) or (IND2_10 = 1 and IND2_15 = 0) or IND2_11 = 1 or (IND2_12 = 1 and BOOL_F = 0 and IND2_15 = 0) or (IND2_12 = 1 and IND2_02 = 0 and BOOL_F = 1 and IND2_15 = 0) or (IND2_13 = 1 and BOOL_F = 0) or (IND2_13 = 1 and IND2_02 = 0 and BOOL_F = 1) or IND2_14 = 1	*NLS* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4* *IA- Interlock*
		BX Red	IND1_15 = 1	*Override Interlock and Interlock active*
		BX Yellow	(BOOL_C = 1 or IND2_15 = 1) and IND1_15=0	*Override Interlock and Interlock active*
3.4	**Printout Blocked**	**P** Yellow	PR_BLK=1	*NLS (Printout blocked OS)*
3.5	**Alarm Blocked**	**B** Yellow	AL_BLK=1	*NLS (Alarm blocked OS)*
		Bx Yellow	AL_P_BLK=1	*NLS (Alarm period blocked)*
3.6	**Fault/Alarm Indication**	**F** Red Flash	AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_11 = 1 or AU_IND1_12 = 1	*NLS (Unacknowledged alarm)*

No	Description	Presentation	Condition	Remarks
		F Red	IND1_07 = 1 or IND1_09 = 1 or IND1_11 = 1 or IND1_12 = 1	*Alarm* *Limit* *Fault* *Communication error*
4	**Motor Status**	Grey ⊗	IND2_00 = 0	*Out of service*
		Green ⊗	IND2_01 = 0 or IND2_08 = 1 or IND2_10 = 1 or IND2_11 = 1 or IND2_12 = 1 or IND2_13 = 1 or	*Not Ready for Start* *Not Ready Run* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4*
		Green ⊘	IND2_14 = 1	*A - Interlock*
		Green ◉	IND2_02 = 1	*Drive running*
		Green ●	IND2_01 = 1	*Drive ready to start* *Ready Run*
		Medium Green (K5) (Centre part)	IND2_02 =1	*Running*
		Medium Green (K5), Light green (L5), Dark green (M5), Black (K16) (Centre part background)	All others except out of service	
5	**Running mode Indication**			
		↑	IND2_02 = 1 and speed value positive	*Forward*
		↓	IND2_02 = 1 and speed value negative	*Reverse*
		⇧	IND2_01 = 1	*Run permitted*
7.1	**Headline Speed**	**Spd** Grey	INTWB_00 = 1	*NLS (Speed)*

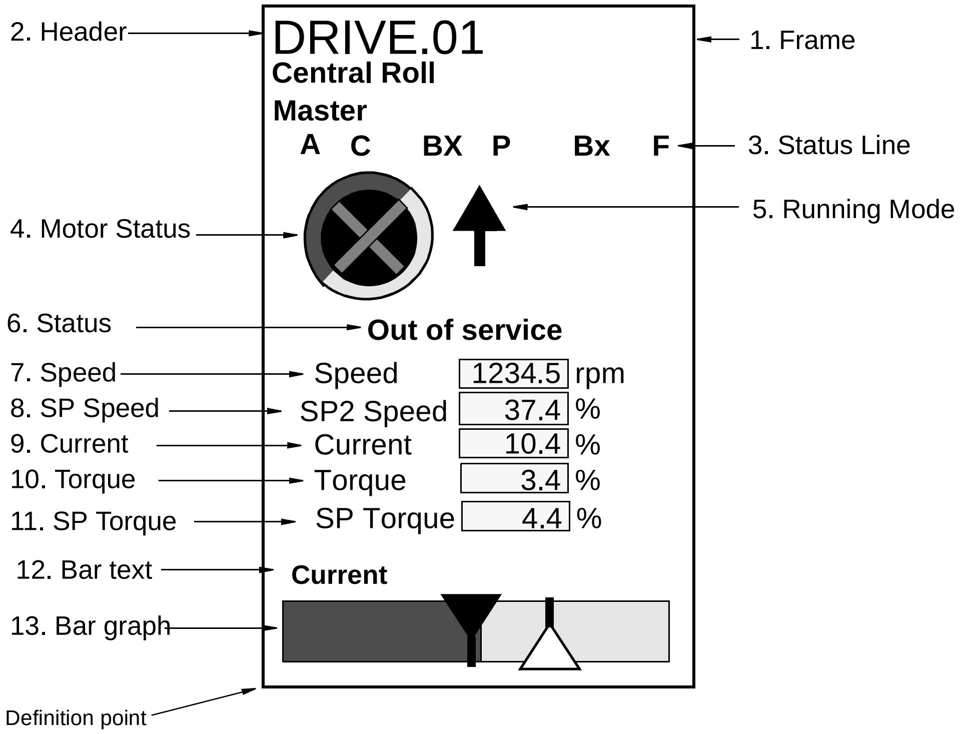
No	Description	Presentation	Condition	Remarks
7.2	**Speed value**	Value string (1 dec.) Green	REAL_C	
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
7.3	**Unit Speed**	String (5) Green	PRES_A(1-5)	
8.1	**Headline Set Point Speed**	**ESP1** Grey	INTWB11 = 1 and BOOL_E = 1	NLS (ESP1
		ESP2 Grey	(INTWB_12 = 1 or INTWB_14 = 1) and BOOL_E = 1	*NLS (ESP2)*
		SP1 Grey	INTWB_11 = 1 and BOOL_E = 0	*NLS (SP1)*
		SP2 Grey	(INTWB_12 = 1 or INTWB_14 = 1) and BOOL_E = 0	*NLS (SP2)*
8.2	**SetPoint speed value**	ESP1 Cyan	REAL_D (help drive object) and (BOOL_E = 1 and INTWB11= 1)	*External set point value for speed unit*
		ESP2, Cyan	REAL_D and (BOOL_E = 1 INTWB12=1) or REAL_E and (BOOL_E = 1 INTWB14=1)	*External set point value for speed %* *External set point value for torque %*
		SP1, Cyan	REAL_PARAM (help drive object) and (BOOL_E = 0 and INTWB11=1)	*Set point value for speed unit*
		SP2, Cyan	REAL_PARAM and (BOOL_E = 0) and (INTWB12=1 or INTWB_14 = 1)	*Set Point value for speed %* *Set point value for torque %*
8.3	**Unit SetPoint Speed**	String (5) Cyan	(INTWB_11 = 1 and BOOL_E = 1) or (INTWB_11 = 1 and BOOL_E = 0) and PRES_A (1-5)	*unit*
		% String Cyan	((INTWB_12 = 1 or INTWB_14 =1) and (BOOL_E =1)) or ((INTWB12 = 1 or INTWB_14 = 1) and (BOOL_E = 0))	*unit*

No	Description	Presentation	Condition	Remarks
9	**Warning text or Blocking Interlock Text**	**Out of Service** Yellow	IND2_00 = 0	*NLS (Out of service)*
		Comm Err Red Flash	AU_IND1_12 = 1	*NLS (Communication Error) unacknowledged fault*
		Comm Err Red	IND1_12 = 1	*NLS (Communication Error)*
		Fault Red Flash	AU_IND1_11 = 1	*NLS (Fault) unacknowledged fault*
		Fault Red	IND1_11 = 1	*NLS (Fault)*
		Alarm Red Flash	AU_IND1_07 = 1	*NLS (Alarm) unacknowledged Alarm*
		Alarm Red	IND1_07 = 1	*NLS (Alarm)*
		At Limit Red Flash	AU_IND1_09 = 1	*NLS (Limit) unacknowledged limit*
		At Limit Red	IND1_09 = 1	*NLS (Limit)*
		Interlock text Red	ACT_PRES_TEXT	*Get the actual interlock text from the database. Valid for interlocks IC, IB1-IB4,*
		Interlock text Yellow	ACT_PRES_TEXT	*Get the actual interlock text from the database. Valid for interlock IA*
		Check Status/Limit Green	BOOL_G = 1	*Indicate that the status word or the limit word has changed.*
		Not At Setpoint Green	IND2_02 = 1 and IND2_07 = 0	*NLS (Actual value at not reference)*
		Ready Run Green	IND2_01 = 1 and IND2_02 = 0	*NLS (Ready Run)*
		Ready Green	IND2_00 = 1 and IND2_01 = 0	*NLS (Ready*
10.	**Bar graph, Motor Torque**		INTWB_01 = 1 or INTWB_02 = 1	*Bar graph Visible*
10.1		Bar graph +, Brown	INTWB_01 = 1 and REAL_RES REAL_RES_MIN to REAL_RES_MAX	*Motor current value*
		Bar graph +/-, Brown	INTWB_01 = 1 and REAL_RES_MIN<0 REAL_RES -REAL_RES_MAX to REAL_RES_MAX	*Motor current value*

No	Description	Presentation	Condition	Remarks
10.2		Bar graph +, Magenta	INTWB_02 = 1 and REAL_A REAL_A_MIN to REAL_A_MAX	*Motor torque value*
		Bar graph +/-, Magenta	INTWB_02 = 1 and REAL_A_MIN<0 REAL_A -REAL_A_MAX to REAL_A_MAX	*Motor torque value*
10.3	**Hi Load Indication**	at 100%	INTWB_01 = 1	*Limit Visible for current only*
		Filled Yellow	AL_BLK=1 and REAL_RES > REAL_RES_HILIM or AL_P_BLK=1 and REAL_RES > REAL_RES_HILIM	*High load, Alarm blocked*
		Unfilled Yellow	AL_P_BLK=1 or AL_BLK = 1	*Alarm blocked*
		Filled Red	REAL_RES > REAL_RES_HILIM	*The value of current has passed the high load limit.*
		Unfilled, Grey		*Not high load*
10.4	**Normal Load Limit Indication**		INTWB_01 = 1	*Limit Visible for current only*
		Arrow (polygon)	at REAL_RES_LOLIM REAL_RES_MIN to REAL_RES_MAX	*Upper limit of normal load*
		Filled Yellow	AL_BLK=1 and REAL_RES > REAL_RES_LOLIM or AL_P_BLK=1 and REAL_RES > REAL_RES_LOLIM	*Above normal load, Alarm blocked*
		Unfilled Yellow	AL_P_BLK=1 or AL_BLK = 1	*Alarm blocked*
		Filled Grey	REAL_RES > REAL_RES_LOLIM	*The value of current has passed the normal load limit.*
		Unfilled, Grey		*Normal*
11	**Bar graph text**	Curr, Grey	INTWB_01 = 1	*NLS (Curr) Current*
		Torq, Grey	INTWB_02 = 1	*NLS (Torq) Torque*

A.8 DRIGR01

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Select Frame**	White	SELECTED = 1	*Object select Frame*
		Black		
2.1	**Name**	String (20), NameFont	NAME	*Object name*
		Red Flash	AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_11 = 1 or AU_IND1_12 = 1	*Unacknowledged Alarm*
		Red	ND1_07 = 1 or ND1_09 = 1 or IIND1_11 = 1 or IND1_12 = 1	*Alarm* *Limit* *Fault* *Communication error*
		Green		
2.2	**Description** String	String (20)	DESCRIPTION	*Object description*
		Same Color coding as for NAME		
3.	**Status Line**			

No	Description	Presentation	Condition	Remarks
3.1	**Mode**	**M** Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	*NLS (Man)*
		A Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	*NLS (Auto)*
3.2	**Point of Control**	**O** Yellow	IND2_00 = 0	*NLS (Out of service)*
		D Yellow	IND2_09 = 0	*NLS (Drive local)*
		J Yellow	BOOL_C = 1 and IND2_09 = 1	*NLS (Jog)*
		L Green	BOOL_D = 1 and IND2_09 = 1	*NLS (Local)*
		C Green	BOOL_C = 0 and BOOL_D = 0 and IND2_09 = 1	*NLS (Central)*
3.3	**Interlock indications**	**X** Yellow	(IND2_12 = 1 and IND2_02 = 1 and BOOL_F = 1 and IND2_15 = 0) or (IND2_13 = 1 and IND2_02 = 1 and BOOL_F = 1)	*B- Interlock 3* *B - Interlock 4*
		X Green	(IND2_08 = 1) or (IND2_10 = 1 and IND2_15 = 0) or IND2_11 = 1 or (IND2_12 = 1 and BOOL_F = 0 and IND2_15 = 0) or (IND2_12 = 1 and IND2_02 = 0 and BOOL_F = 1 and IND2_15 = 0) or (IND2_13 = 1 and BOOL_F = 0) or (IND2_13 = 1 and IND2_02 = 0 and BOOL_F = 1) or IND2_14 = 1	*NLS* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4* *IA- Interlock*
		BX Red	IND1_15 = 1	*Override Interlock and Interlock active*
		BX Yellow	(BOOL_C = 1 or IND2_15 = 1) and IND1_15=0	*Override Interlock and Interlock active*
3.4	**Printout Blocked**	**P** Yellow	PR_BLK=1	*NLS (Printout blocked OS)*

No	Description	Presentation	Condition	Remarks
3.5	**Alarm Blocked**	**B** Yellow	AL_BLK=1	*NLS (Alarm blocked OS)*
		Bx Yellow	AL_P_BLK=1	*NLS (Alarm period blocked)*
3.6	**Fault/Alarm Indication**	**F** Red Flash	AU_IND1_11 = 1 or AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_12 = 1	*NLS (Unacknowledged alarm)*
		F Red	IND1_11 = 1 or IND1_07 = 1 or IND1_09 = 1 or IND1_12 = 1	*NLS (Fault)* *NLS (Alarm)* *NLS (Limit)* *Communication error*
4	**Motor Status**	Grey ⊗	IND2_00 = 0	*Out of service*
		Green ⊗	IND2_01 = 0 or IND2_08 = 1 or IND2_10 = 1 or IND2_11 = 1 or IND2_12 = 1 or IND2_13 = 1 or	*Not Ready for Start* *Not Ready Run* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4*
		Green ⊘	IND2_14 = 1	*A - Interlock*
		Green ●	IND2_01 = 1	*Drive ready to start* *Ready Run*
		Green ◉	IND2_02 = 1	*Drive running*
		Medium Green (K5) (Centre part)	IND2_02=1	*Running*
		Medium Green (K5), Light green (L5), Dark green (M5), Black (K16) (Centre part background)	All others except out of service.	
5	**Running mode Indication**	⬆	IND2_02 = 1 and speed value positive	ForwColor *Forward*

No	Description	Presentation	Condition	Remarks
		⬇	IND2_02 = 1 and speed value negative	RewColor *Reverse*
		⇧	IND2_01 = 1	ForwColor *Run permitted*
		Green		
6	**Warning text or Blocking Interlock Text**	**Out of Service** Yellow	IND2_00 = 0	*NLS (Out of service)*
		Comm Err Red Flash	AU_IND1_12 = 1	*NLS (Communication Error) unacknowledged fault*
		Comm Err Red	IND1_12 = 1	*NLS (Communication Error)*
		Fault Red Flash	AU_IND1_11 = 1	*NLS (Fault) unacknowledged fault*
		Fault Red	IND1_11 = 1	*NLS (Fault)*
		Alarm Red Flash	AU_IND1_07 = 1	*NLS (Alarm) unacknowledged Alarm*
		Alarm Red	IND1_07 = 1	*NLS (Alarm)*
		At Limit Red Flash	AU_IND1_09 = 1	*NLS (Limit) unacknowledged limit*
		At Limit Red	IND1_09 = 1	*NLS (Limit)*
		Interlock text Red	ACT_PRES_TEXT	*Get the actual interlock text from the database. Valid for interlocks IC, IB1-IB4,*
		Interlock text Yellow	ACT_PRES_TEXT	*Get the actual interlock text from the database. Valid for interlock IA*
		Check Status/Limit Green	BOOL_G = 1	*Indicate that the status word or the limit word has changed.*
		Not At Setpoint Green	IND2_02 = 1 and IND2_07 = 0	*NLS (Actual value at not reference)*
		Ready Run Green	IND2_01 = 1 and ind2_02 = 0	*NLS (Ready Run)*
		Ready Green	IND2_00 = 1 and IND2_02 = 0	*NLS (Ready*
7.1	**Headline Speed**	**Speed** Grey	INTWB_00 = 1	*NLS (Speed)*
7.2	**Speed value**	Green	REAL_C	*Numeric presentation of speed value 1*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*

No	Description	Presentation	Condition	Remarks
7.3	**Unit Speed**	String (5) Green	PRES_A(1-5)	*Unit of measured Speed*
8.1	**Headline Set Point Speed**	**E SP1 Spd** Grey	INTWB11 = 1 and BOOL_E = 1	NLS (E SP1 Spd)
		E SP2 Spd Grey	INTWB_12 = 1 and BOOL_E = 1	*NLS (E SP2 Spd)*
		SP1 Speed Grey	INTWB_11 = 1 and BOOL_E = 0	*NLS (SP1 Speed)*
		SP2 Speed Grey	INTWB_12 = 1 and BOOL_E = 0	*NLS (SP 2 Speed)*
8.2	**SetPoint speed value**	ESP1 Cyan	REAL_D (help drive object) and (BOOL_E = 1 and INTWB11= 1)	*External set point value for speed unit*
		ESP2, Cyan	REAL_D and (BOOL_E = 1 INTWB12=1)	*Set point value for speed %*
		SP1, Cyan	REAL_PARAM (help drive object) and (BOOL_E = 0 and INTWB11=1)	*Set point value for speed unit*
		SP2, Cyan	REAL_PARAM and (BOOL_E = 0 and INTWB12=1)	*Set Point value for speed %*
8.3	Unit SetPoint Speed	String Cyan	(INTWB_11 = 1 and BOOL_E = 1) or (INTWB_11 = 1 and BOOL_E = 0) and PRES_A[1..5]	*unit*
		% String (5) Cyan	(INTWB_12 = 1 and BOOL_E =1) or (INTWB12 = 1 and BOOL_E = 0)	*%*
9.1	**Headline Current**	Grey	INTWB_01 = 1	*NLS (Current)*
9.2	**Current value**	Value string, Brown	REAL_RES	*Numeric presentation of Current*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
9.3	**Current Unit**	Brown	%	*Unit of current*
10.1	**Headline Torque**	Grey	INTWB_02 = 1	*NLS (Torque)*
10.2	**Torque value**	Magenta	REAL_A	*Numeric presentation of Torque*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
10.3	**Torque Unit**	String (5) Magenta	%	*Unit of Torque*

No	Description	Presentation	Condition	Remarks
11.1	**Headline External Set Point Torque/ Set Point Torque/ PID**	**E SP Torq** Grey	INTWB_14 = 1 and BOOL_E = 1	*Head line of External Set Point Torque* *NLS (E SP Torq)*
		SP Torque Grey	INTWB_14 = 1 and BOOL_E = 0	*Head line of External Set Point Torque* *NLS (SP Torque)*
11.2	**External Set Point Torque/ Set Point Torque /**	E SP Torque Cyan	REAL_E and (BOOL_E = 1 and INTWB14= 1)	*External set point value for torque*
		SP Torque, Cyan	REAL_PARAM and (BOOL_E = 0 INTWB14=1)	*Set point value for torque*
11.3	**Unit External Set Point Torque/ Set Point Torque / PID**	String (5) Cyan	%	*Unit of External Set Point Torque or Set Point Torque or PID*
12	**Baragraph text**	Current, Grey	INTWB_01 = 1	*NLS (Current) Current*
		Torque, Grey	INTWB_02 = 1	*NLS (Torque) Torque*
13	**Bar graph, Motor Current**		INTWB_01 = 1 or INTWB_02 = 1	*Bar graph Visible*
13.1		Bar graph +, Magenta	INTWB_02 = 1 and REAL_A REAL_A_MIN to REAL_A_MAX	*Motor torque value*
		Bar graph +/-, Magenta	INTWB_02 = 1 and REAL_A_MIN<0 REAL_A -REAL_A_MAX to REAL_A_MAX	*Motor torque value*
13.2		Bar graph +, Brown	INTWB_01 = 1 and REAL_RES REAL_RES_MIN to REAL_RES_MAX	*Motor current value*
		Bar graph +/-, Brown	INTWB_01 = 1 and REAL_RES_MIN<0 REAL_RES -REAL_RES_MAX to REAL_RES_MAX	*Motor current value*
13.3	**Hi Load Indication**	at 100%	INTWB_01 = 1	*Limit Visible for current only.*
		Filled Yellow	AL_BLK=1 and REAL_RES > REAL_RES_HILIM or AL_P_BLK=1 and REAL_RES > REAL_RES_HILIM	*Above high load, Alarm blocked*
		Unfilled Yellow	AL_P_BLK=1 or AL_BLK = 1	*Alarm blocked*
		Filled Red	REAL_RES > REAL_RES_HILIM	*The value of current has passed the high load limit.*
		Unfilled, Grey		*Not high load*

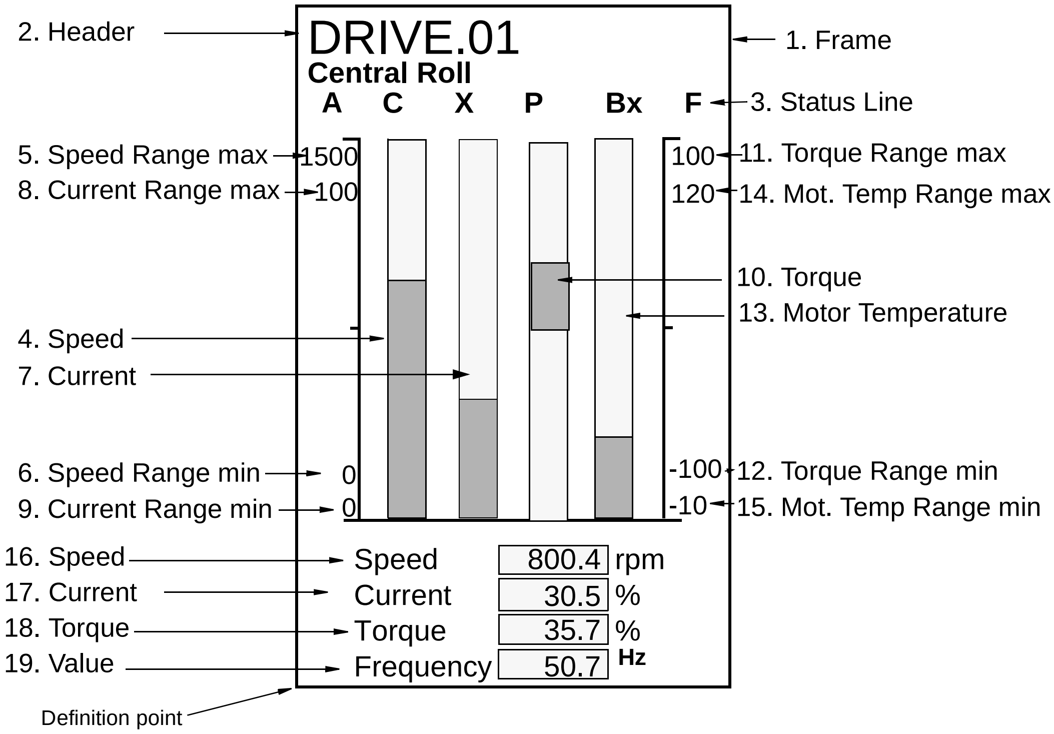
No	Description	Presentation	Condition	Remarks
13.4	**Normal Load Limit Indication**		INTWB_01 = 1	*Limit Visible*
		Arrow (polygon)	at REAL_RES_LOLIM REAL_RES_MIN to REAL_RES_MAX	*Upper limit of normal load*
		Filled Yellow	AL_BLK=1 and REAL_RES > REAL_RES_LOLIM or AL_P_BLK=1 and REAL_RES > REAL_RES_LOLIM	*Above normal load, Alarm blocked*
		Unfilled Yellow	AL_P_BLK=1 or AL_BLK = 1	*Alarm blocked*
		Filled Grey	REAL_RES > REAL_RES_LOLIM	*The value of current has passed the normal load limit.*
		Unfilled, Grey		*Normal*

Configuration:

Parameters	Affects	Options (bold is default)	Remarks
RefType	Type of drive object	**DRICONS**, DRICONE	*42=Standard drive, 49=Engineered drive*
ObjectName	Setpoint values	**.FL**	*Name of fault mmcx database element if it exists*
NameFont	Name	**FC50**	*Font of Name*
ForwColor	Arrow	**K5**	*Color for forward direction of drive.*
RewColor	Arrow	**K5**	*Color for rewerse direction of drive.*

A.9 DRIGR02

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Select Frame**	White	SELECTED = 1	*Object select Frame*
		Black		
2.1	**Name**	String (20) NameFont	NAME	*Object name*
		Red Flash	AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_11 = 1 or AU_IND1_12 = 1	*Unacknowledged Alarm*
		Red	IND1_07 = 1 or IND1_09 = 1 or IND1_11 = 1 or IND1_12 = 1	*Alarm* *Limit* *Fault* *Communication error*
		Green		
2.2	**Description** String	String (20)	DESCRIPTION	*Object description*
		Same Color coding as for NAME		

No	Description	Presentation	Condition	Remarks
3.	**Status Line**			
3.1	**Mode**	**M** Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	*NLS (Man)*
		A Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	*NLS (Auto)*
3.2	**Point of Control**	**O** Yellow	IND2_00 = 0	*NLS (Out of service)*
		D Yellow	IND2_09 = 0	*NLS (Drive local)*
		J Yellow	BOOL_C = 1 and IND2_09 = 1	*NLS (Jog)*
		L Green	BOOL_D = 1 and IND2_09 = 1	*NLS (Local)*
		C Green	BOOL_C = 0 and BOOL_D = 0 and IND2_09 = 1	*NLS (Central)*
3.3	**Interlock indications**	**X** Yellow	(IND2_12 = 1 and IND2_02 = 1 and BOOL_F = 1 and IND2_15 = 0) or (IND2_13 = 1 and IND2_02 = 1 and BOOL_F = 1)	*B- Interlock 3* *B - Interlock 4*
		X Green	(IND2_08 = 1) or (IND2_10 = 1 and IND2_15 = 0) or IND2_11 = 1 or (IND2_12 = 1 and BOOL_F = 0 and IND2_15 = 0) or (IND2_12 = 1 and IND2_02 = 0 and BOOL_F = 1 (and IND2_15 = 0) or (IND2_13 = 1 and BOOL_F = 0) or (IND2_13 = 1 and IND2_02 = 0 and BOOL_F = 1) or IND2_14 = 1	*NLS* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4* *IA- Interlock*
		BX Red	IND1_15 = 1	*Override Interlock and Interlock active*
		BX Yellow	(BOOL_C = 1 or IND2_15 = 1) and IND1_15=0	*Override Interlock and Interlock active*
3.4	**Printout Blocked**	**P** Yellow	PR_BLK=1	*NLS (Printout blocked OS)*

No	Description	Presentation	Condition	Remarks
3.5	**Alarm Blocked**	**B** Yellow	AL_BLK=1	*NLS (Alarm blocked OS)*
		Bx Yellow	AL_P_BLK=1	*NLS (Alarm period blocked)*
3.6	**Fault/Alarm Indication**	**F** Red Flash	AU_IND1_11 = 1 or AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_12 = 1	*NLS (Unacknowledged alarm)*
		F Red	IND1_11 = 1 or IND1_07 = 1 or IND1_09 = 1 or IND1_12 = 1	*NLS (Fault)* *NLS (Alarm)* *NLS (Limit)* *Communication error*
4	**Bar graph Speed**	Green	REAL_C	*Speed bar graph*
		Bar graph +	INTWB_00 = 1 and REAL_C REAL_C_MIN to REAL_C_MAX	*Bar graph when speed min value is positive.*
		Bar graph +/-	INTWB_00 = 1 and REAL_C_MIN<0 REAL_C -REAL_C_MAX to REAL_C_MAX	*Bar graph when speed min value is negative.*
5	**Speed Bar graph Range Max**	Value string (0 dec.) Green	REAL_C_MAX	*Range Max of speed value*
6	**Speed Bar graph Range Min**	Value string (0 dec.) Green	REAL_C_MIN>0 REAL_C_MIN	*Range Min of speed value*
			REAL_C_MIN<0 -REAL_C_MAX	
7	**Bar graph Current**	Brown	REAL_RES	*Current bar graph*
		Bar graph +	INTWB_01 = 1 and REAL_RES REAL_RES_MIN to REAL_RES_MAX	*Bar graph when current min value is positive.*
		Bar graph +/-	INTWB_01 = 1 and REAL_RES_MIN<0 REAL_RES -REAL_RES_MAX to REAL_RES_MAX	*Bar graph when current min value is negative.*
8	**Current Range Max**	Value string (0 dec.) Brown	REAL_RES_MAX	
9	**Current Range Min**	Value string (0 dec.) Brown	REAL_RES_MIN>0 REAL_RES_MIN	*Range Min of current value*
			REAL_RES_MIN<0 -REAL_RES_MAX	

No	Description	Presentation	Condition	Remarks
10	**Bar graph Torque**	Magenta	REAL_A	*Torque bar graph*
		Bar graph +	INTWB_02 = 1 and REAL_A REAL_A_MIN to REAL_A_MAX	*Bar graph when torque min value is positive.*
		Bar graph +/-	INTWB_02 = 1 and REAL_A_MIN<0 REAL_A -REAL_A_MAX to REAL_A_MAX	*Bar graph when torque min value is negative.*
11	**Torque Bar graph Range Max**	Value string (0 dec.) Magenta	REAL_A_MAX	*Range Max of torque value*
12	**Torque Bar graph Range Min**	Value string (0 dec.) Magenta	REAL_A_MIN>0 REAL_A_MIN	*Range Min of torque value*
			REAL_A_MIN<0 -REAL_A_MAX	
13	**"Value" Bar graph**	Beige	REAL_B	*Value bar graph. Value is any text you put in PRES_B and the value comes from REAL_B.*
		Bar graph +	INTWB_03 = 1 and RefType = DRICONE and REAL_B REAL_B_MIN to REAL_B_MAX	*Bar graph when "value" min value is positive.*
		Bar graph +/-	INTWB_03 = 1 and RefType = DRICONE and REAL_B_MIN<0 REAL_B -REAL_B_MAX to REAL_B_MAX	*Bar graph when "value" min value is negative.*
14	**"Value" Bar graph Range Max**	Value string (0 dec.) Magenta	REAL_B_MAX	*Range Max of value*
15	**"Value" Bar graph Range Min**	Value string (0 dec.) Magenta	REAL_B_MIN>0 REAL_B_MIN	*Range Min of value*
			REAL_B_MIN<0 -REAL_B_MAX	
16.1	**Headline Speed**	Grey	INTWB_00 = 1	*NLS (Speed)* *ValueFont*
16.2	**Speed value**	Green	REAL_C	*Numeric presentation of speed value 1*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
16.3	**Unit Speed**	String (5) Green	PRES_A(1-5)	*Unit of measured Speed*

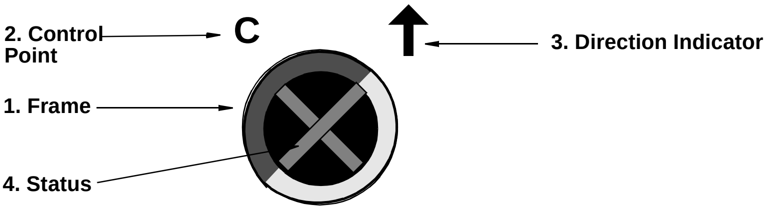
No	Description	Presentation	Condition	Remarks
17.1	**Headline Current**	Grey	INTWB_01 = 1	*NLS (Current)*
17.2	**Current value**	Value string, Brown	REAL_RES	*Numeric presentation of Current*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
17.3	**Current Unit**	Brown	%	*Unit of current*
18.1	**Headline Torque**	Grey	INTWB_02 = 1	*NLS (Torque)*
18.2	**Torque value**	Value string, Magenta	REAL_A	*Numeric presentation of Torque*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
18.3	**Torque Unit**	String (5) Magenta	%	*Unit of Torque*
19.1	**Headline “Value”**	**“Value”** Grey (M16)	INTWB_03 and RefType = DRICONE	*NOTE: Engineered Drive only!*
19.2	**“Value”**	Value string, Beige	REAL_B	*Motor temperature value*
		? ? ? Red Flash	AU_IND1_12 =1	*Communication error Unacknowledged*
		? ? ? Red	IND1_12 =1	*Communication error*
19.3	**“Value” Unit**	Beige	PRES_A[6..10]	*Unit from main MMCX database element.*

Configuration:

Parameters	Affects	Options (bold is default)	Remarks
RefType	Type of drive object	**DRICONS**, DRICONE	*42=Standard drive,* *49=Engineered drive*
NameFont	Name	**FC50**	*Font of Name*

A.10 DRIPD01

Presentation:



Behavior:

No	Description	Presentation	Condition	Remarks
1	**Select Frame**	White	SELECTED = 1	*Selected*
		Dotted Yellow	AL_BLK = 1	*Alarm blocked by operator*
		Black	-	FrameColor
2	**Control point**	ModeVisible = true		
		O Yellow	IND2_00= 0	*Out of service* OutOfServiceColor
		D Yellow	IND2_09= 0	*Drive Local Control* DriveLocalColor
		J Yellow	BOOL_C = 1 and IND2_09 = 1	*Jog Control* JogColor
		L Green	BOOL_D = 1 and IND2_09 = 1	*Local Control* LocalColor
		A Green	BOOL_B = 1 and BOOL_A = 0 and IND2_09 = 1	*NLS (Auto)* AutoColor
		ManModeVisible = true		
		M Green	BOOL_A = 1 and BOOL_B = 0 and IND2_09 = 1	*NLS (Man)* ManColor
		ManModeVisible = false		
		C Green	IND2_09 = 1 and BOOL_C = 0 and BOOL_D = 0	*Central Control* CentralColor
		-	PointOfControlVisible = false	*Control point not visible*
3	**Direction Indication**		DirectionVisible = true	
		Green 🠅	IND2_02 = 1 and speed value positive	ForwHighColor *Forward*

No	Description	Presentation	Condition	Remarks
		Green ↓	IND2_02 = 1 and speed value negative	RewLowColor *Reverse*
		Green ↑	IND2_01 = 1	ForwHighColor *Run permitted*
		-	DirectionVisible = false	*Direction is invisible*
4	**Drive Status** shape	Grey ⊗	IND2_00 = 0	*Out of service*
		Green ⊗	IND2_01 = 0 or IND2_08 = 1 or IND2_10 = 1 or IND2_11 = 1 or IND2_12 = 1 or IND2_13 = 1 or	*Not Ready for Start* *Not Ready Run* *C - interlock* *B - Interlock 1* *B - Interlock 2* *B- Interlock 3* *B - Interlock 4*
		Green ⊘	IND2_14 = 1	*A - Interlock*
		Green ●	IND2_01 = 1	*Drive ready to start* *Ready Run*
		Green ◉	IND2_02 = 1	*Drive running*
		Red flashing	AU_IND1_07 = 1 or AU_IND1_09 = 1 or AU_IND1_11 = 1 or AU_IND1_12 = 1	*Unacknowledged alarm*
		Red	IND1_07 = 1 or IND1_09 = 1 or IND1_11 = 1 or IND1_12 = 1	*Alarm* *Fault* *Limit* *Communication error*
		Green	-	OnColor

The conditions are in priority order. Underlined parameters are configurable.

Configuration:

Parameters	Affects	Options (bold is default)	Remarks
RefType	Reference type	**DRICONS**, DRICONE	*Choose reference type* *DRICONS = 42 or* *DRICONE = 49.*
PointOfControlVisible	2. Control Point	**true**, false	*Show point of control or not.*
ManModeVisible	2. Control Point	**true**, false	*True = show M when manual mode. False = show C when manual mode.*
OutOfServiceColor	2. Control point	**K3** (Yellow), any color	
DriveLocalColor	2. Control point	**K3** (Yellow), any color	
JogColor	2. Control point	**K3**(Yellow), any color	
LocalColor	2. Control point	**K5** (Green), any color	
AutoColor	2. Control point	**K5**(Green), any color	
ManColor	2. Control point	**K5** (Green), any color	
CentralColor	2. Control point	**K5** (Green), any color	
Font	2. Control point	**FC30**, any font	
OnColor	3. Direction	**K5** (Green), any color	
DirectionVisible	3. Direction	**true**, false	*Show Direction or not.*
UseDisplayColor	3. Direction	**true**, false	*Show background for Direction or not.*
DisplayColor	3. Direction	**N13** (Black), any color	*Background color for Direction*
FrameWidth	1. SelectFrame	**2**, (1..4)	
CenterColor	4. DriveStatus	**K5** (Green), any color	
TopLeftColor	4. Three-Dim. indication	**L5** (Light Green), any color	
MediumColor	4. Three-Dim. indication	**K5** (Green), any color	
BottomRightColor	4. Three-Dim. indication	**M5** (Dark Green), any color	

Appendix B Process Dialog

B.1 Process Dialog for Engineered Drive Controller DRICONE

The display screen is supplemented with a keyboard for operator communication with the functional unit/object.

The dialog is built up using both fixed and dynamic keys. The functions available with the dynamic keys are presented in a pattern of rectangles on the lower part of the display screen when the object is selected. The functional unit DRICONE has a MIN dialog (Production level) and a MAX dialog (Maintenance level).

The MIN dialog consists of an output dialog with 2 subdialogs. The MAX dialog consists of an output dialog with 3 subdialogs.

B.1.1 MIN dialog (No authority key)

Keyboard keys

+ ↑	**Increase**	Increase setpoint value with 0.1% or 1 rpm
⇧ Shift **+** + ↑		Increase setpoint value with 1.0% or 10 rpm
↓ −	**Decrease**	Decrease setpoint value with 0.1% or 1 rpm
⇧ Shift **+** ↓ −		Decrease setpoint value with 1.0% or 10 rpm
Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
◇	**Start**	Start Drive
▽	**Stop**	Stop Drive
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
Dialog	**Next Block**	Page between the dynamic key sets (Keyboard and Order)

Dynamic keys, Top Level

D1	D2 Central	D3 Local	D4 Jog	D5
D6 *Diagnostic...*	D7	D8	D9 *Order…*	D10 *Keyboard…*

Central	Set control to Central Pressed:green text Released: white text	MORD_10 = 1
Local	Set control to Local Pressed:green text Released: white text	MORD_11 = 1
Jog	Set control to Jog Pressed:green text Released: white text	MORD_12 = 1
Diagnostic…	Select Dynamic keys: Diagnostic	
Order…	Select Dynamic keys: Order	
Keyboard…	Select Dynamic keys: Keyboard	

Dynamic keys, Diagnostic

D1 Fault	D2 Alarm	D3 Status/Limit	D4	D5
D6	D7	D8	D9	D10

Fault	Call up fault display as overlap
Alarm	Call up alarm display as overlap
Status/Limit	Call up status/limit display as overlap

Dynamic keys, Order

D1 Operator Setpoint	D2	D3	D4	D5 Reset Fault
D6 External Setpoint	D7	D8	D9	D10

Reset Fault	Reset Drive fault	MORD_08 = 1
Operator Setpoint	Set use of operator setpoint	MORD_06 = 1
External Setpoint	Set use of external setpoint	MORD_07 = 1

Dynamic keys, Keyboard

D1 ■ Start	D2 Man	D3 Auto	D4	D5
D6 □ Stop	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Start	Run drive with selected reference	MORD_02 = 1
Man	Set to manual mode	MORD_14 = 1
Auto	Set to automatic mode	MORD_15 = 1
Stop	Stop drive	MORD_03 = 1
Acknowledge	Acknowledge alarm	
Object Display	Select Object Display	
Object Trend	Select Object Trend	

B.1.2 MAX dialog (Authority key)

Keyboard keys

+ ↑	**Increase**	Increase setpoint value with 0.1% or 1 rpm
⇧ Shift **+** + ↑		Increase setpoint value with 1.0% or 10 rpm
↓ –	**Decrease**	Decrease setpoint value with 0.1% or 1 rpm
⇧ Shift **+** ↓ –		Decrease setpoint value with 1.0% or 10 rpm
Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
◇	**Start**	Start Drive
▽	**Stop**	Stop Drive
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
Dialog	**Next Block**	Page between the dynamic key sets (Keyboard, Order and Block)

Dynamic keys, Top Level

D1	D2 Central	D3 Local	D4 Jog	D5 Out of Service
D6 *Diagnostic...*	D7	D8 *Block...*	D9 *Order…*	D10 *Keyboard…*

Central	Set control to Central Pressed:green text Released: white text	MORD_10 = 1
Local	Set control to Local Pressed:green text Released: white text	MORD_11 = 1
Jog	Set control to Jog Pressed:green text Released: white text	MORD_12 = 1
Out of Service	Set control to out of Service. The order is only carried out if the Drive is stopped. Pressed:green text Released: white text	MORD_13 = 1
Diagnostic…	Select Dynamic keys: Diagnostic	
Block…	Select Dynamic keys: Block	
Order…	Select Dynamic keys: Order	
Keyboard…	Select Dynamic keys: Keyboard	

Dynamic keys, Diagnostic

D1 Fault	D2 Alarm	D3 Status/Limit	D4	D5
D6	D7	D8	D9	D10

Fault	Call up fault display as overlap
Alarm	Call up alarm display as overlap
Status/Limit	Call up status/limit display as overlap

Dynamic keys, Order

D1 Operator Setpoint	D2	D3 I	D4	D5 Reset Fault
D6 External Setpoint	D7	D8	D9	D10

Reset Fault	Reset Drive fault	MORD_08 = 1
Operator Setpoint	Set use of operator setpoint	MORD_06 = 1
External Setpoint	Set use of external setpoint	MORD_07 = 1

Dynamic keys, Keyboard

D1 ■ Start	D2 Man	D3 Auto	D4	D5
D6 □ Stop	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Start	Run drive with selected reference	MORD_02 = 1
Man	Set to manual mode	MORD_14 = 1
Auto	Set to automatic mode	MORD_15 = 1
Stop	Stop drive	MORD_03 = 1
Acknowledge	Acknowledge alarm	
Object Display	Select Object Display	
Object Trend	Select Object Trend	

Dynamic keys, Block…

D1	D2 Block Alarm	D3 Block Printout	D4	D5 Override Interlock
D6	D7 Deblock Alarm	D8 Deblock Printout	D9	D10 Normal Interlock

Block Alarm	Block alarm indication
Block Printout	Block event printout
Override Interlock	Override interlocking
Deblock Alarm	Deblock alarm indication
Deblock Printout	Deblock event printout
Normal Interlock	Interlocking

Appendix C PC Elements

C.1 General

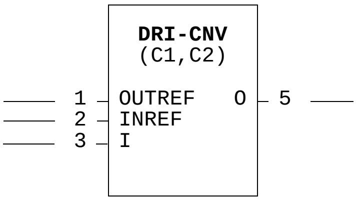
The description of the DRI-CNV, DRI-R and DRI-S PC elements is a reprint from *PC elements Advant Controller 400 Series Reference Manual*.

Convert Data with Scale Factor DRI-CNV

Summary

DRI-CNV (DRIve CoNVert) converts data to from integer and real by using a scaling algorithm.

DRI-CNV is useful for conversion of data received by DRI-R or sent by DRI-S.



Call DRI-CNV(C1, C2,)

Parameter	Significance	Permissible values
C1	Input data type	I, R
C2	Output data type	I, R

Terminal Description

No	Name	Type	Description
1	OUTREF	I*C1*	Value of **OUT REF**erence which corresponds to value defined at in reference. This value is used for scaling, see formula below.
2	INREF	I*C2*	Value of **IN REF**erence which corresponds to the value defined at out reference. This value is used for scaling, see formula below.
3	I	I*C1*	**I**nput, Input data to be converted
5	O	O*C2*	**O**utput, Output for converted data

Function

Data input I with data type accordance with call parameter *C1* is converted to data with data type accordance to call parameter *C2* at the output O. The conversion is using the following formula for scaling.

$$O = \frac{I \times OUTREF}{INREF}$$

When conversion is to the data type I, overflow can occur at the max or min limit values. The output signal is then limited to the upper and lower limits of integer data (-32768 - 32767).

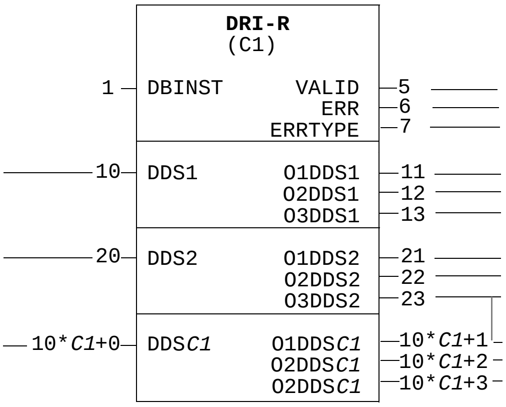
The quotient of the out reference and in reference is calculated only at every 20:th. cycle to reduce the load on the element. The result is buffered and used in the rest of the calculation. The OUTREF and INREF should therefore not be dynamic.

Receive Drive Data on Advant Fieldbus 100 DRI-R

Summary

DRI-R (DRIve - Receive) is used for receiving drive cyclic data on Advant Fieldbus 100. Depending on the drive, different data base elements are used for configuration of the communication characteristics. The data base element can be one of the following types.

DRISTD - standard drive connected to a S800 I/O station.
DRIENG - engineered drive connected to a S800 I/O station.



Call DRI-R(C1)

Parameter	Significance	Permissible values
C1	Number of Drive Data Sets	1 .. 10

Terminal Description

No	Name	Type	Description
1	DBINST	II	**D**ata **B**ase **INST**ance. The instance number of DRISTD or DRIENG in the S800 interface file, alternatively the name of the DRISTD or DRIENG instance.
5	VALID	OB	**Valid** data is present
6	ERR	OB	**ERR**or flag
7	ERRTYPE	OI	**ERR**or **TYPE**
10	DDS1	II	**D**rive **D**ata **S**et number for **1**:st group of data
11	O1DDS1	OI	**O**utput **1** from **D**rive **D**ata **S**et **1**
12	O2DDS1	OI	**O**utput **2** from **D**rive **D**ata **S**et **1**
13	O3DDS1	OI	**O**utput **3** from **D**rive **D**ata **S**et **1**
...			
10**C1* +0	DDS*C1*	II	**D**rive **D**ata **S**et number for *C1* group of data
10**C1* +1	O1DDS*C1*	OI	**O**utput **1** from **D**rive **D**ata **S**et *C1*
10**C1* +2	O2DDS*C1*	OI	**O**utput **2**from **D**rive **D**ata **S**et *C1*
10**C1* +3	O3DDS*C1*	OI	**O**utput **3**from **D**rive **D**ata **S**et *C1*

Function

DRI-R is used for receiving cyclic drive data over Advant Fieldbus. Data of type Integer is supported. The drive is connected to an S800 I/O station. The DBINST terminal refers to the data base element DRISTD or DRIENG. The data to the drive are only in integer format. Conversion PC-element DRI-CNV converts integer data to real with proper scaling.

You specify the number of Drive Data Set to receive data from with call parameter C1. The DDSx terminal specifies from which Drive Data Set the group of 3 output values are received from.

When drives are connected to controllers (AC 70 or APC2), PC-element DSP-R is used together with DSP data base elements.

Configuration

The configuration work involved depends on how the drive is connected:

1. **Drive connected to S800 I/O station**

The communication is configured by means of DRISTD or DRIENG data base element. The DRISTD is used for standard drive hardware and DRIENG is used for engineered drives. The data base elements are configured according to the DB element specification.

The terminal IOSCANT configures the cycle time for data to be transfer on the bus for standard drives (in ms).
Allowed values are specified in the DB element specification.

The address of the drive is specified by BUS, STATION and POSITION.

2. **Drive connected to controller (AC70 or APC2)**

See the description of PC-element DSP-R.

Valid

The output terminal VALID indicates if the values available on the data output terminals are updated. The VALID terminal indicates as soon as one DDS has invalid data.

Error handling

The following error codes can be reported on the ERRTYPE terminal:

0 OK
1 Data base element according to DBINST is not found. The data base element could be DRISTD or DRIENG.
3 Error detected by corresponding data base element or illegal DB configuration
4 Bus Error. The AF 100 interface module is not reachable
5 Data set number out of range

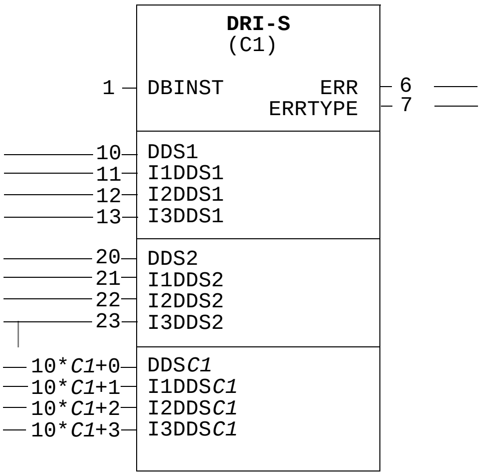
The terminal ERR is set to 1 if ERRTYPE <> 0.

Send Drive Data on Advant Fieldbus 100 DRI-S

Summary

DRI-S (DRIve - Send) is used for sending drive cyclic data on Advant Fieldbus 100. Depending on the drive different data base elements are used for configuration of the communication characteristics. The data base element can be one of the following types.

DRISTD - standard drive connected to a S800 I/O station.
DRIENG - engineered drive connected to a S800 I/O station.



Call DRI-S(C1)

Parameter	Significance	Permissible values
C1	Number of Drive Data Sets	1 .. 10

Terminal Description

No	Name	Type	Description
1	DBINST	II	**D**ata **B**ase **INST**ance. The instance number of DRISTD or DRIENG in the S800 interface file, alternatively the name of the DRISTD or DRIENG instance.
6	ERR	OB	**ERR**or flag
7	ERRTYPE	OI	**ERR**or **TYPE**
10	DDS1	II	**D**rive **D**ata **S**et number for **1**:st group of data
11	I1DDS1	II	**I**nput **1** to **D**rive **D**ata **S**et **1**
12	I2DDS1	II	**I**nput **2** to **D**rive **D**ata **S**et **1**
13	I3DDS1	II	**I**nput **3** to **D**rive **D**ata **S**et **1**
...			
10**C1* +0	DDS*C1*	II	**D**rive **D**ata **S**et number for *C1* group of data
10**C1* +1	I1DDS*C1*	II	**I**nput **1** to **D**rive **D**ata **S**et *C1*
10**C1* +2	I2DDS*C1*	II	**I**nput **2**to **D**rive **D**ata **S**et *C1*
10**C1* +3	I3DDS*C1*	II	**I**nput **3**to **D**rive **D**ata **S**et *C1*

Function

DRI-S is used for sending cyclic drive data over Advant fieldbus. Data of type Integer is supported. The drive is connected to a S800 I/O station. The DBINST terminal refers to the data base element DRISTD or DRIENG. The data to the drive are only in integer format. Conversion PC-element DRI-CNV converts real data to integer which are transmitted on the bus.

The user specifies the number of Drive Data Set to send data to with call parameter C1. The DDSx terminal specifies to which Drive Data Set the group of 3 input values are sent to.

When drives are connected to controllers (AC 70 or APC2) PC-element DSP-S are used together with DSP data base elements.

Configuration

The configuration work involved, depending how the drive is connected are as follow:

1. **Drive connected to S800 I/O station**

The communication is configured by means of DRISTD or DRIENG data base element. The DRISTD is used for standard drive hardware and DRIENG is used for engineered drives. The data base elements are configured according to the DB element specification.

The terminal IOSCANT configures the cycle time for data to be transfer on the bus for standard drives (in ms). Allowed values are specified in the DB element specification.

The address of the drive is specified by BUS, STATION and POSITION.

2. **Drive connected to controller (AC70 or APC2)**

See the description of PC-element DSP-S.

Error handling

The following error codes can be reported on the ERRTYPE terminal:

0 OK
1 Data base element according to DBINST is not found. The data base element could be DRISTD or DRIENG.
3 Error detected by corresponding data base element or illegal DB configuration
4 Bus Error. The AF100 interface module is not reachable
5 Data set number out of range

The terminal ERR is set to 1 if ERRTYPE <> 0.

Appendix D Data Base Elements

D.1 General

The description of the DRIENG data base element is a reprint from *Data Base elements Advant Controller 400 Series Reference Manual*.

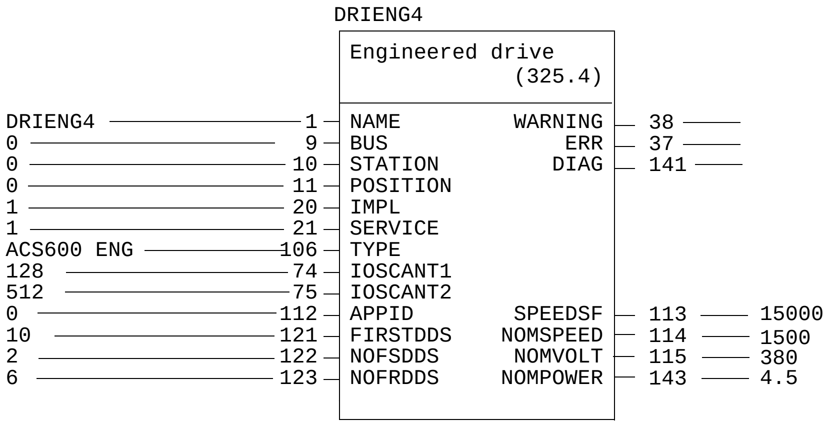
The description of the usage of the MMCX data base element in DRICONE functional unit is based on the MMCX data base element description in *Data Base elements Advant Controller 400 Series Reference Manual* but the terminal description focus on DRICONE functionality.

Engineered drive DRIENG

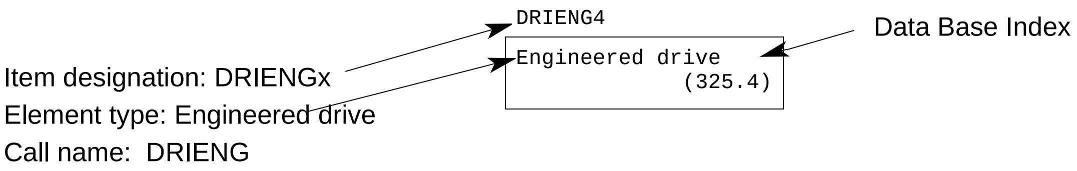
Summary

The DRIENG module data base element specifies an engineered drive hardware module connected to a S800 I/O station.

Overview



Head



Terminal Description

Termi-nal No	**Terminal Name**	**Value entered by**	**Default value**	**PC con-nection data type**	**Description**	**Remarks**
1	NAME	user	DRIENGx	–	Unique **NAME** of the I/O module.	Maximum 20 characters.
9	BUS	user	0	–	**BUS**. Part of Address.	
10	STATION	user	0	–	**STATION**. Part of Address.	
11	POSITION	user	0	–	**POSITION**. Part of Address.	
20	IMPL	user	1	B(r)	0=the module is spare. 1=the module is **IMPL**emented	–
21	SERVICE	dialog	1	B(r/w)	The **SERVICE** terminal shows whether the drive is in service or has been taken out of service.	–
106	TYPE	user	ACS600 ENG	–	**TYPE** defines the type of drive.	Maximum 10 characters.
74	IOSCANT1	user	512	–	Fieldbus **I**nput **O**utput **SCAN T**ime. **1** Used for fast send and receive data to/from the drive. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048 and 4096.	The IOSCANT1 refers to Drive Data Sets 10 ..19
75	IOSCANT2	user	1024	–	Fieldbus **I**nput **O**utput **SCAN T**ime. **2** Used for slow send and receive data to/from the drive. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048 and 4096.	The IOSCANT2 refers to Drive Data Sets 20 .. 29
112	APPID	user	0	–	**APP**lication **ID**entity which has to match with the application identity in the drive. 0 no match is required >0 match is required	Not implemented in drive.
118	FIRSTDDS	user	10	-	**FIRST D**rive **D**ata **S**et in data set table.	Must be changed if the first drive data set in drive doesn’t comply to the default value.
122	NOFSDDS	user	2	-	**N**umber **OF S**end **D**rive **D**ata **S**et.	
123	NOFRDDS	user	6	-	**N**umber **OF R**eceive **D**rive **D**ata **S**et.	The value of this terminal cannot be less then the value of NOFSDDS
38	WARNING	system	–	B(r)	**WARNING** indicates a non-fatal error.	–

Terminal Description (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
37	ERR	system	–	B(r)	**ERR**or indicates fatal errors, such as configuration errors or hardware errors.	–
141	DIAG	system	–	I(r)	**DIAG**nostics.	–
113	SPEEDSF	system	-	I(r)	**SPEED S**cale **F**actor is used in calculations to get the rpm of the motor.	Uploaded from drive when implemented = 1
114	NOMSPEED	system	-	I(r)	**NOMi**nal **SPEED** of motor. This value can be used by the application in calulations of the actual speed.	Uploaded from drive when implemented = 1
115	NOMVOLT	system	-	I(r)	**NOM**inal **VOLTAGE** of motor. This value can be used by the application in calulations of the actual voltage.	Uploaded from drive when implemented = 1
143	NOMPOWER	system	-	R(r)	**NOM**inal **POWER** of motor. This value can be used by the application in calulations of the actual power.	Uploaded from drive when implemented = 1

Function

With the data base element you set up the drive module for the process communication program. The process communication program creates two sending and two receiving CDPs. IOSCANT1 determines the transmission intervals for both the sending and receiving CDP used for data which are frequently exchanged. IOSCANT2 determines the transmission intervals for both the sending and receiving CDP used for data which are infrequently exchanged.

Module Set-up Procedure

The module set-up procedure includes:

1. Implementation
2. Disabling
3. Selection of address (BUS, STATION, POSITION) terminals
4. Selection of IOSCANT1 and IOSCANT2
5. Upload of speed scale factor, nominal speed, power and voltage (SPEEDSF, NOMSPEED, NOMPOWER, NOMVOLT) from drive only when implemented is set to 1 or when the system is started. This function is handled by the system
6. Error handling

1. Implementation

During system INIT and when implemented is set to 1 the module is included in the process communication. If you set IMPL=0 on the module, the module is removed from the process communication at the next scan.

2. Disabling

You can use the ”SERVICE” terminal to disable, and later enable the module. This saves some but not all CPU load. This function can be used if a module must be unplugged during operation, to avoid unnecessary system messages. See Advant Station 500 Series Operator Station manual if Advant Station 500 Series Operator Station is included in your system. When the “SERVICE” terminal is 0 values are only read from the module.

3. Selection of address (BUS, STATION, POSITION) terminals

In order to set up a DRI800SENG data base element to exchange data with the drive. The following terminals defines the address to the drive.:

BUS = number of the bus connected to the I/O station for the actual drive

STATION = a positive number 1 - 79 of the I/O station.

POSITION = a positive number (101 - 112), (201 - 212) - (701 - 712)

The POSITION number in the data base element must agree to the address defined in the drive.

4. Selection of IOSCANT1 and IOSCANT2

The IOSCANT1 and IOSCANT2 terminal defines the cycle time to be used on Advant Fieldbus 100 to send/receive drive process data from the I/O station to the AC 400 Series Controller. The selection of cycle time (IOSCANT1 and IOSCANT2) shall be choosen with care due to bus bandwidth. The maximum load on AF 100 is 75% for (cyclic) process data transfer. For additional information about AF 100 see *Advant Fieldbus 100 User's Guide*. The following table describes the load generated by the DRIENG module for all available cycle times:

Generated AF 100 load in percent at different cycle times on IOSCANT1 and IOSCANT2

1ms	2ms	4ms	8ms	16ms	32ms	64ms	128ms	256ms	512ms	1024ms	2048ms	4096ms
50.4%	25.2	12.6%	6.3%	3.15%	1.575%	0.788%	0.394%	0.197%	0.098%	0.049%	0.025%	0.12%

The total load for an engineered drive is the sum of load for IOSCANT1 and IOSCANT2, see formula below:

$$\text{total load} = (\text{load generated by IOSCANT1}) + (\text{load generated by IOSCANT2})$$

The total load if IOSCANT1 is 128 ms and IOSCANT2 is 512 ms are:

$$\text{total load} = 0{,}394 + 0{,}098 = 0{,}492\%$$

5. Definition of application identity APPID

The APPID defines an identity of the drive application. The value of the APPID must be the same as the application identity in the drive. Unequal application identities sets the WARNING flag. A value 0 of APPID overrides the test between the application identity in the controller and drive.

6. Upload of nominal speed, power and voltage (SPEEDSF, NOMSPEED, NOMPOWER, NOMVOLT) from drive (only when IMPL=1 or when system is started)

The NOMSPEED, NOMPOWER and NOMVOLT defines the nominal data of the motor. These values can be used in the AMPL application to calculate actual engineering values of the motor, or the percentage of the nominal values. How the user application is made is determined by the type of received values from the drive (percentage or absolute values).

The SPEEDSF is a scaling factor to use in conversions from actual speed to motor revolutions or from motor revolutions to speed reference set point. The motor revolution and speed reference formulas are as follows:

Motor revolution (in rpm) = (actual speed / 20000) x(SPEEDSF/10)

Speed reference = (rpm x 20000) / (SPEEDSF/10)

7. Error Handling

The ERR terminal is set in DRIENG module element shows errors due to the modules connection to the system or errors detected at configuration. Errors detected by the module itself is not shown if they don’t generate communication errors. The normal S800 supervision supervises the modules. Example of indicated errors are:

- non-existent hardware
- wrong module type
- malfunctioning, software or data base errors

The ”ERR” terminal can be connected to the PC program for desired function. ERR is reset, at hardware errors, automatically after replacement of the faulty module.

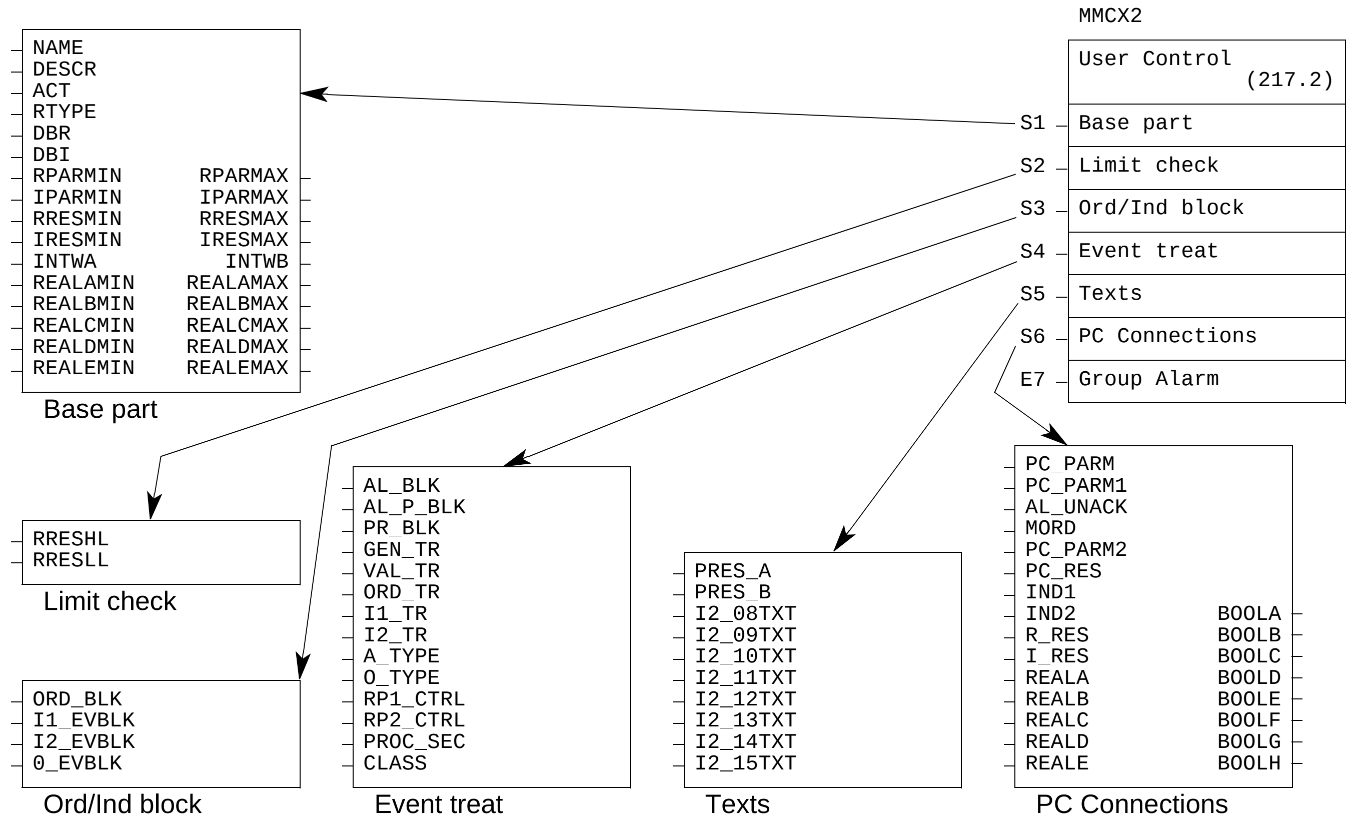
User Control for DRICONE main DB-element MMCX

Summary

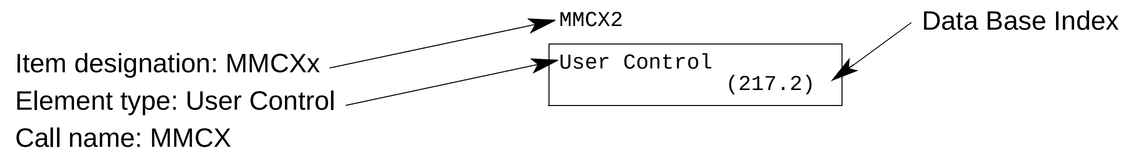
The User Control data base element is used to build Advant Station 500 Series Operator Station functions for functional units. Some static information is given. For information about the extension parts of Group Alarm see data base element Group Member. The terminal description focus on DRICONE functionality. The main DRICONE DB-element stores all basic data for presentation and dialogs.

Parameters that can be changed from the dialog can be given start values.

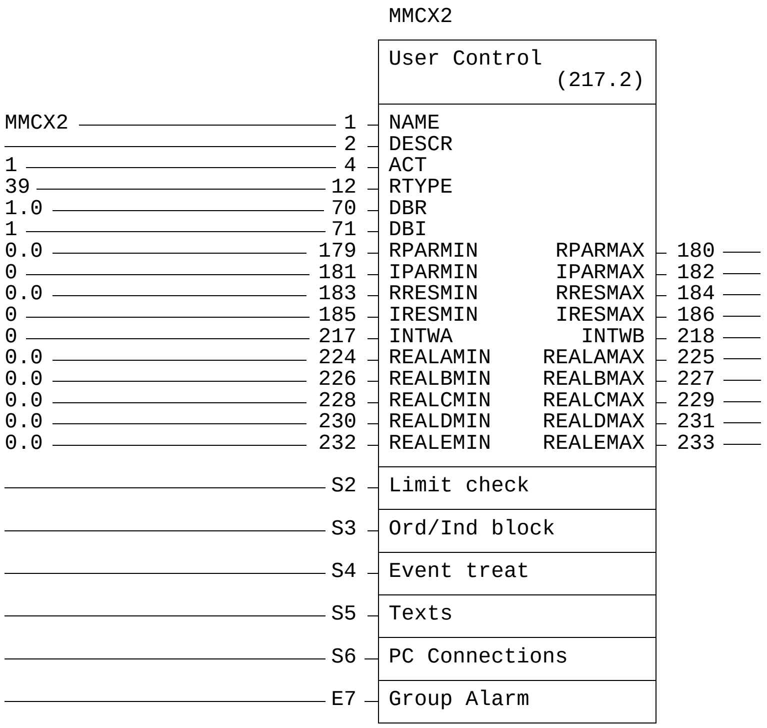
Overview



Head



Base part


MMCX2
User Control
(217.2)
MMCX2 1 NAME
2 DESCR
1 4 ACT
39 12 RTYPE
1.0 70 DBR
1 71 DBI
0.0 179 RPARMIN RPARMAX 180
0 181 IPARMIN IPARMAX 182
0.0 183 RRESMIN RRESMAX 184
0 185 IRESMIN IRESMAX 186
0 217 INTWA INTWB 218
0.0 224 REALAMIN REALAMAX 225
0.0 226 REALBMIN REALBMAX 227
0.0 228 REALCMIN REALCMAX 229
0.0 230 REALDMIN REALDMAX 231
0.0 232 REALEMIN REALEMAX 233
S2 Limit check
S3 Ord/Ind block
S4 Event treat
S5 Texts
S6 PC Connections
E7 Group Alarm

Terminal Description, Base part

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
1	NAME	user	MMCXx	–	Each Drive object must be given a unique **NAME**. For example ABC 123.	Max. 20 characters. Spaces are not allowed. 15 characters is recommended in order to follow the naming convention in the DRIS3 type circuit.
2	DESCR	user	–	–	**DESCR**iption of the Drive object that is shown in Operator Station.	Max. 20 characters. Any information regarding the Drive object may be entered.
4	ACT	user	1	B(r/w)	1=operator communication is **ACT**ive.	0=communication is blocked and events are not updated.
12	RTYPE	user	39	–	**R**eference **TYPE** for GROUP.	49 Used for functional unit DRICONE.

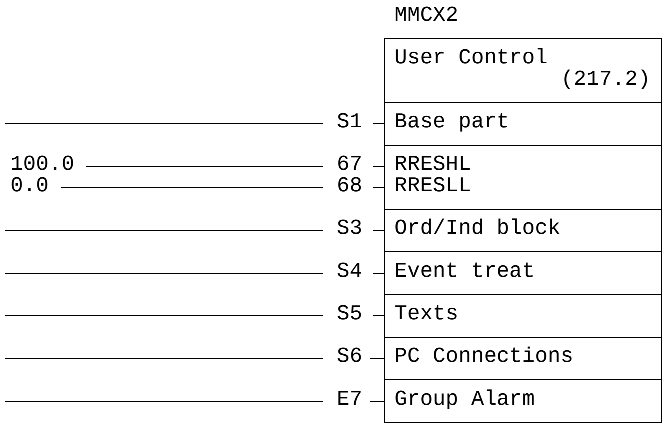
Terminal Description, Base part (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
70	DBR	user	1.0	R(r/w)	Delta **R**eal determines the size of the change in value of REAL RES (Actual Motor Currnet in %) that gives event controlled updating of the picture.	–
71	DBI	user	1	IL(r/w)	Delta **I**ntl determines the size of the change in value of INTL RES that gives event controlled updating of the picture.	Not used in DRICONE.
179	RPARMIN	user	0.0	R(r/w)	**R**eal **PAR**ameter **MIN**imum. Minimum value of Speed Setpoint in %.	–
180	RPARMAX	user	100.0	R(r/w)	**R**eal **PAR**ameter **MAX**imum. Maximum value of Speed Setpoint in %.	–
181	IPARMIN	user	0	IL(r/w)	**I**ntl **PAR**ameter **MIN**imum. Minimum value of INTL PARAM.	Not used in DRICONE.
182	IPARMAX	user	100	IL(r/w)	**I**ntl **PAR**ameter **MAX**imum. Shows the address setting in the Drive.	
183	RRESMIN	user	0.0	R(r/w)	**R**eal **RES MIN**imum. Minimum value of Motor Current.	–
184	RRESMAX	user	100.0	R(r/w)	**R**eal **RES MAX**imum. Maximum value of Motor Current.	–
185	IRESMIN	user	0	IL(r/w)	**I**ntl **RES MIN**imum. Minimum value of INTL RES.	Not used in DRICONE.
186	IRESMAX	user	100	IL(r/w)	**I**ntl **RES MAX**imum. Maximum value of INTL RES.	Not used in DRICONE.
217	INTWA	user	0	I(r/w)	**INT**eger **W**ord **A**. The integer word is used to indicate different configuration alternative regarding help MMCX DB-element **.**	–
218	INTWB	user	0	I(r/w)	**INT**eger **W**ord **B**. Integer indicates different visibility possibilities for the presentation. See Table 3-23.	–
224	REALAMIN	user	0.0	R(r)	**MIN**imum value of **REAL A**. Torque minimum value	–
225	REALAMAX	user	100.0	R(r)	**MAX**imum value of **REAL A**.Torque maximum value.	–
226	REALBMIN	user	0.0	R(r)	**MIN**imum value of **REAL B**. Minimum value an arbitrarily value from Drive (frequency, power and so on)	–

Terminal Description, Base part (Continued)

Terminal No	**Terminal Name**	**Value entered by**	**Default value**	**PC connection data type**	**Description**	**Remarks**
227	REALBMAX	user	100.0	R(r)	**MAX**imum value of **REAL B**. Maximum value an arbitrarily value from Drive (frequency, power and so on)	–
228	REALCMIN	user	0.0	R(r)	**MIN**imum value of **REAL C**. Actual speed minimum value.	–
229	REALCMAX	user	100.0	R(r)	**MAX**imum value of **REAL C**. Actual speed maximum value.	–
230	REALDMIN	user	0.0	R(r)	**MIN**imum value of **REAL D**. External speed setpoint in % minimum value.	–
231	REALDMAX	user	100.0	R(r)	**MAX**imum value of **REAL D**. External speed setpoint in % maximum value.	–
232	REALEMIN	user	0.0	R(r)	**MIN**imum value of **REAL E**. External torque setpoint in % minimum value.	–
233	REALEMAX	user	100.0	R(r)	**MAX**imum value of **REAL E**. External torque setpoint in % maximum value.	–

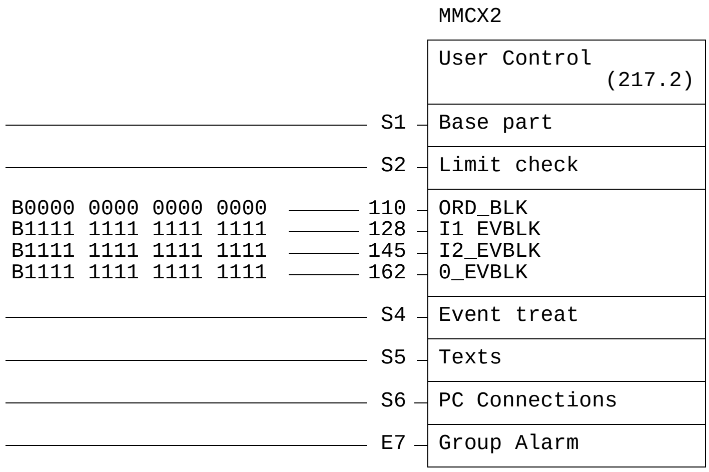
Limit check



Terminal Description, Limit check

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
67	RRESHL	user	100.0	R(r/w)	**R**eal **RES** **H**igh **L**imit. Highest limit used by PC for limit check of the Motor current.	–
68	RRSLL	user	0.0	R(r/w)	**R**eal **RES** **L**ow **L**imit. Lowest limit used by PC for limit check of the Motor current.	–

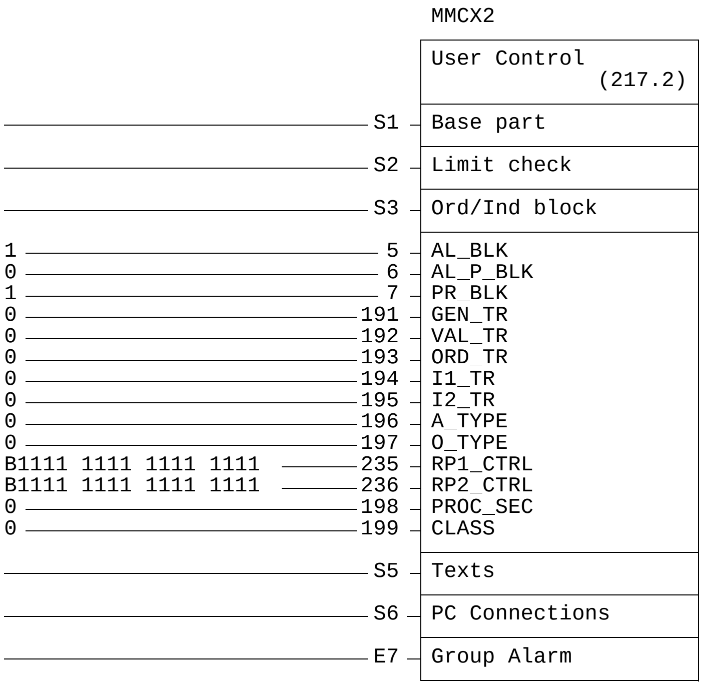
Ord/Ind block


MMCX2
User Control (217.2)
S1 Base part
S2 Limit check
B0000 0000 0000 0000 110 ORD_BLK
B1111 1111 1111 1111 128 I1_EVBLK
B1111 1111 1111 1111 145 I2_EVBLK
B1111 1111 1111 1111 162 0_EVBLK
S4 Event treat
S5 Texts
S6 PC Connections
E7 Group Alarm

Terminal Description, Ord/Ind block

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
110	ORD_BLK	user	H'0000	I(r/w)	**BL**oc**K**ing of manual **ORD**ers. New value can be entered as a hexadecimal string, for example H'000, or as a binary string, for example B0000 0000 0000 0000.	–
128	I1_EVBLK	user	H'FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **1**. New value can be entered as a hexadecimal string, eg. H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
145	I2_EVBLK	user	H'FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **2**. New value can be entered as a hexadecimal string, eg. H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
162	O_EVBLK	user	H'FFFF	–	**BL**oc**K**ing of **EV**ents at manual **O**rders. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–

Event treat



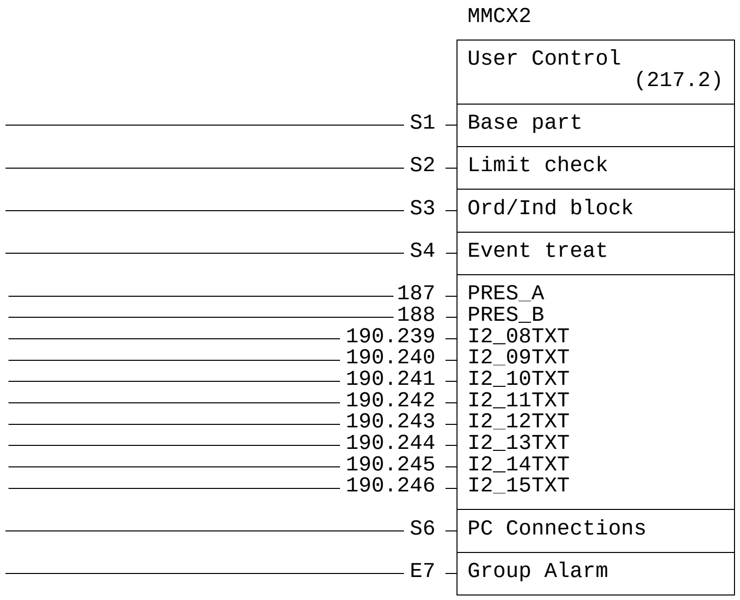
Terminal Description, Event treat

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
5	AL_BLK	dialog	1	–	**BL**ocKing of **AL**arms to alarm list.	–
6	AL_P_BLK	system	0	B(r/w)	**AL**arm **P**eriod **BL**oc**K** flag for temporary blocking of alarm indication and event handling in Operator Station by PC program.	–
7	PR_BLK	dialog	1	–	**BL**oc**K**ing of alarms to **PR**inter and other units.	–
191	GEN_TR	user	0	–	The **GEN**eral **TR**eatment terminal assigns item numbers for event handling of ALARM BLocK orders and PRINT BLocK orders.	Not used in DRICONE.
192	VAL_TR	user	0	–	**VAL**ue **TR**eatment. Item numbers for event treatment of REAL PARAM orders, INTL PARAM orders, REAL RES LOLIM orders and REAL RES HILIM orders.	Not used in DRICONE.

Terminal Description, Event treat (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
193	ORD_TR	user	0	–	The manual **ORD**er **TR**eatment terminal assigns item numbers for event handling of manual orders MORD_00 - MORD_15.	Not used in DRICONE.
194	I1_TR	user	0	–	The **I**ndication **TR**eatment of IND**1** specifies which EVENT TREAT data base element is to be used in the Operator Station.	334 Used for DRICONE alarms.
195	I2_TR	user	0	–	The **I**ndication **TR**eatment of IND**2** specifies which EVENT TREAT data base element is to be used in the Operator Station.	335 Used for DRICONE events.
196	A_TYPE	user	0	–	**A**nalyse **TYPE**. 0=Error handling of IND1 and IND2 in Operator Station 1=No error handling of IND1 or IND2 except for IND1_08.	–
197	O_TYPE	user	0	–	**O**rder **TYPE**.	Always set to 0.
235	RP1_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 1** blocks error in the corresponding bit of the IND1. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
236	RP2_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 2** blocks error in the corresponding bit of the IND2. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
198	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16. 0=no sectioning. The signal may be presented in lists –1=the signal can't be selected and can't be presented in lists.	–
199	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

Texts



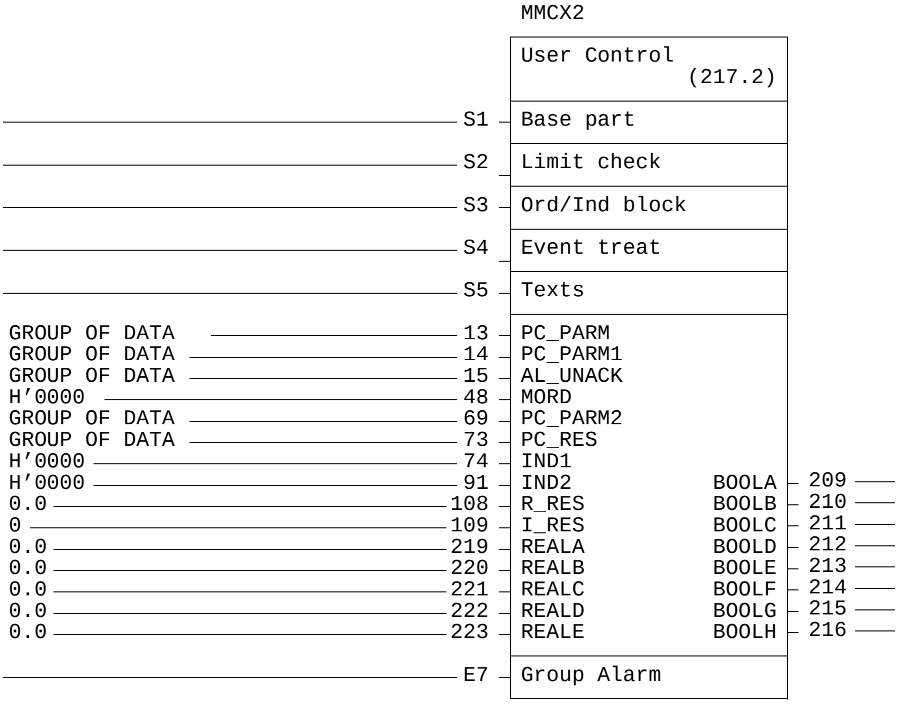
Terminal Description, Texts

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
187	PRES_A	user	–	–	**PRES A**. Freely usable text. Characters 1 - 5 is used for absolute speed unit, 6 - 10 is used for REAL_B unit.	Max. 10 characters.
188	PRES_B	user	–	–	**PRES B**. Used for free text of variable shown for REAL_B.	Max. 10 characters.
190.239	I2_08TXT	user	–	–	**I**nd**2 08** pres **T**e**XT**. Text attached to IND2 08. Safety interlock text.	Highest priority. Max. 17 characters. Interlock IC1.
190.240	I2_09TXT	user	–	–	**I**nd**2 09** pres **T**e**XT**. Text attached to IND2 09.	Max. 17 characters. Not used in DRICONE.
190.241	I2_10TXT	user	–	–	**I**nd**2 10** pres **T**e**XT**. Text attached to IND2 10. Process interlock 1 text.	Max. 17 characters. Interlock IB1.
190.242	I2_11TXT	user	–	–	**I**nd**2 11** pres **T**e**XT**. Text attached to IND2 11. Process interlock 2 text.	Max. 17 characters. Interlock IB2.
190.243	I2_12TXT	user	–	–	**I**nd**2 12** pres **T**e**XT**. Text attached to IND2 12. Process interlock 3 text.	Max. 17 characters. Interlock IB3.

Terminal Description, Texts (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
190.244	I2_13TXT	user	–	–	**I**nd**2 13** pres **T**e**XT**. Text attached to IND2 13. Process interlock 4 text.	Max. 17 characters. Interlock IB4.
190.245	I2_14TXT	user	–	–	**I**nd**2 14** pres **T**e**XT**. Text attached to IND2 14. Sequence interlock text.	Max. 17 characters. Interlock IA.
190.246	I2_15TXT	user	–	–	**I**nd**2 15** pres **T**e**XT**. Text attached to IND2 15.	Lowest priority. Max. 17 characters. Not used in DRICONE.

PC Connections



Terminal Description, PC Connections

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
13	PC_PARM	system	–	A32(r/w)	The **PC PAR**a**M**eters terminal contains group data.	Not used in DRICONE.

Terminal Description, PC Connections (Continued)

Termi-nal No	**Terminal Name**	**Value entered by**	**Default value**	**PC con-nection data type**	**Description**	**Remarks**
14	PC_PARM1	system	–	A24(r/w)	Group data to be connected to the **PCPAR1** terminal of the MMC-ORD PC element.	–
15	AL_UNACK	system	–	IL(r/w)	Group data over **UNACK**nowledged **AL**arms.	–
48	MORD	dialog and PC	–	I(r/w)	Group data for **M**anual **ORD**ers from the operator. Used for acknowledge from PC.	see description in Table 3-7
69	PC_PARM2	system	–	A10(r/w)	Group data to be connected to the **PCPAR2** terminal of the MMC-IND PC element.	–
73	PC_RES	PC	–	A12(r/w)	The **PC RES**ult terminal contains group data (indications, motor current and nominal speed) to be connected from the PCRES terminal of the MMC-IND PC element.	–
74	IND1	system	–	I(r/w)	The **IND**ication **1** terminal contains status indications from PC.	see description in Table 3-10 and Table 3-11
91	IND2	system	–	I(r/w)	The **IND**ication **2** terminal contains status indications from PC.	see description in Table 3-10 and Table 3-11
108	R_RES	system	–	R(r/w)	**R**eal **RES**ult from PC.Motor current value,	–
109	I_RES	system	–	IL(r/w)	Long **I**nteger **RES**ult from PC. Nominal speed value.	–
219	REALA	PC	0.0	R(r/w)	**REAL A**. Actual torque value.	–
220	REALB	PC	0.0	R(r/w)	**REAL B**. Arbitrarily value (frequency, power, temperature and so on).	–
221	REALC	PC	0.0	R(r/w)	**REAL C**. Actual speed value.	–
222	REALD	PC	0.0	R(r/w)	**REAL D**. External speed setpoint in % value.	–
223	REALE	PC	0.0	R(r/w)	**REAL E**. External torque setpoint in % value.	–
209	BOOLA	PC	0	B(r/w)	**BOOL**ean **A**. DRICONE is MAN mode.	–
210	BOOLB	PC	0	B(r/w)	**BOOL**ean **B**. DRICONE is in AUTO mode.	–
211	BOOLC	PC	0	B(r/w)	**BOOL**ean **C**. JOG is point of control.	–
212	BOOLD	PC	0	B(r/w)	**BOOL**ean **D**. LOCAL is point of control.	–

Terminal Description, PC Connections (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
213	BOOLE	PC	0	B(r/w)	**BOOL**ean **E**. Use external setpoint.	–
214	BOOLF	PC	0	B(r/w)	**BOOL**ean **F**. Start interlocks IBF are used.	–
215	BOOLG	PC	0	B(r/w)	**BOOL**ean **G**. Gives indication "Check Status/Limit".	Flag to indicate if there is changes in the status word or in the limit word.
216	BOOLH	PC	0	B(r/w)	**BOOL**ean **H**. Indicates type of Drive.	0=ACS type of Drive. 1=DCS type of Drive.

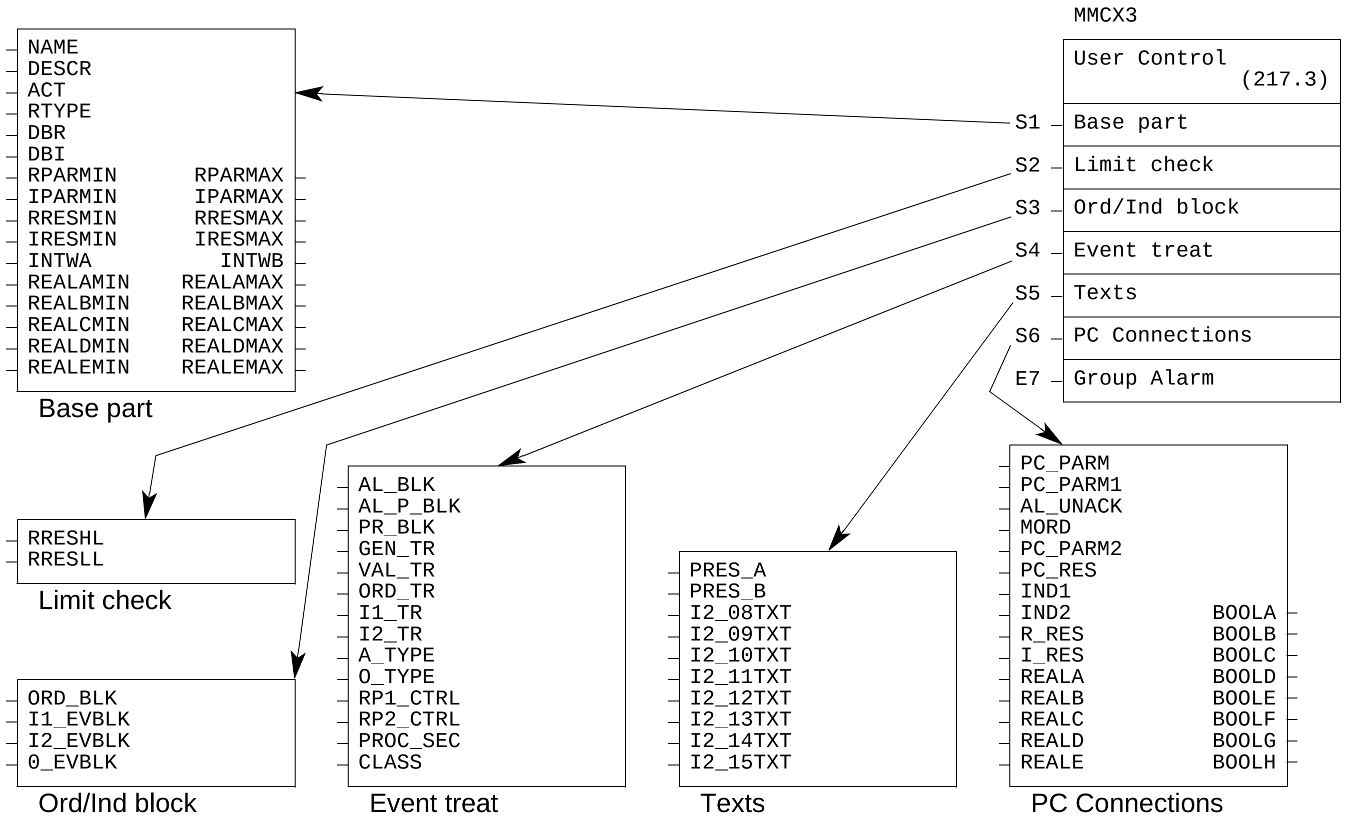
User Control for DRICONE fault DB-element MMCX

Summary

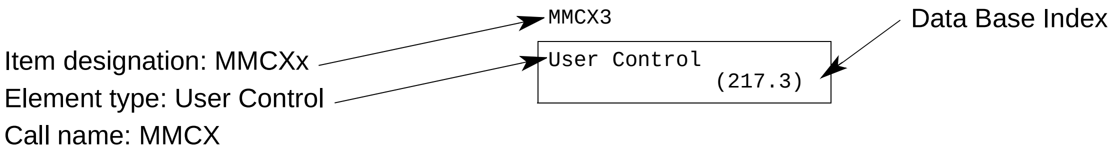
The fault DRICONE DB-element stores additional fault information plus data for additional setpoint handling. The termianls which are really used are only described.

Parameters that can be changed from the dialog can be given start values.

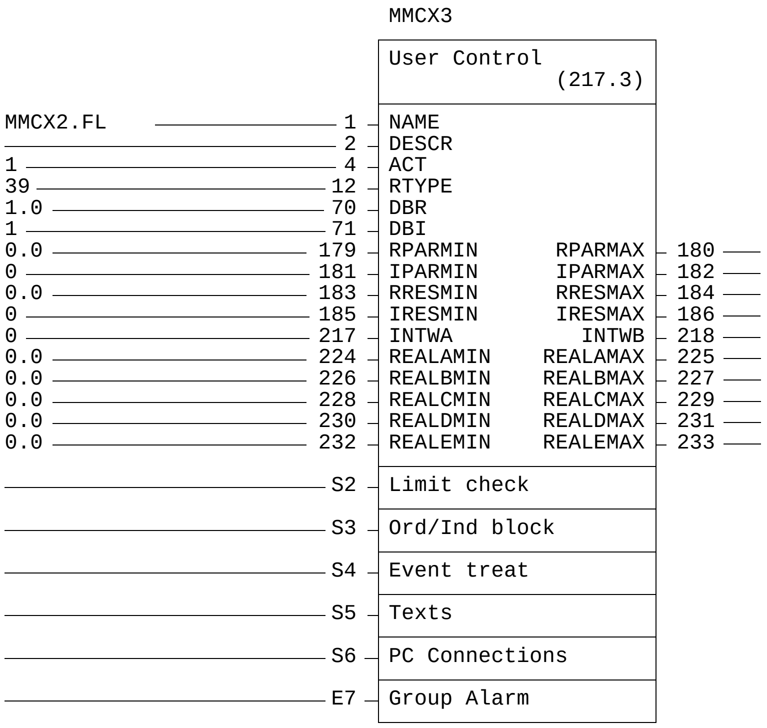
Overview



Head



Base part


MMCX3
User Control
(217.3)
MMCX2.FL 1 NAME
2 DESCR
1 4 ACT
39 12 RTYPE
1.0 70 DBR
1 71 DBI
0.0 179 RPARMIN RPARMAX 180
0 181 IPARMIN IPARMAX 182
0.0 183 RRESMIN RRESMAX 184
0 185 IRESMIN IRESMAX 186
0 217 INTWA INTWB 218
0.0 224 REALAMIN REALAMAX 225
0.0 226 REALBMIN REALBMAX 227
0.0 228 REALCMIN REALCMAX 229
0.0 230 REALDMIN REALDMAX 231
0.0 232 REALEMIN REALEMAX 233
S2 Limit check
S3 Ord/Ind block
S4 Event treat
S5 Texts
S6 PC Connections
E7 Group Alarm

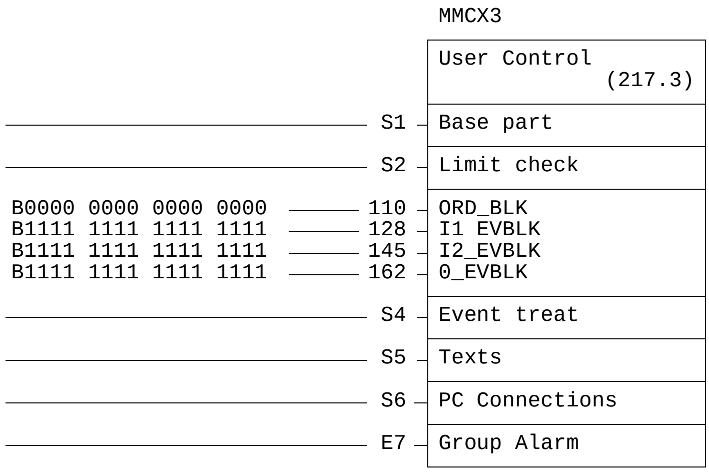
Terminal Description, Base part

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
1	NAME	user	MMCXx	–	Each Drive object must be given a unique **NAME**. For example ABC 123.	Max. 20 characters. Spaces are not allowed. The name must be the same as the main DRICONE DB-element plus the extension **.FL**
2	DESCR	user	–	–	**DESCR**iption of the Drive object that is shown in Operator Station.	Max. 20 characters. Any information regarding the Drive object may be entered.
4	ACT	user	1	B(r/w)	1=operator communication is **ACT**ive.	0=communication is blocked and events are not updated.
12	RTYPE	user	39	–	**R**eference **TYPE** for GROUP.	49 Used for functional unit DRICONE.

Terminal Description, Base part (Continued)

Termi-nal No	**Terminal Name**	**Value entered by**	**Default value**	**PC con-nection data type**	**Description**	**Remarks**
179	RPARMIN	user	0.0	R(r/w)	**R**eal **PAR**ameter **MIN**imum. Minimum value of Speed Setpoint in rpm.	–
180	RPARMAX	user	100.0	R(r/w)	**R**eal **PAR**ameter **MAX**imum. Maximum value of Speed Setpoint in rpm.	–
217	INTWA	user	0	I(r/w)	**INT**eger **W**ord **A**. The integer word is used to indicate changes in the Limit word 1**.**	–
218	INTWB	user	0	I(r/w)	**INT**eger **W**ord **B**. The integer word is used to indicate changes in the auxiliary status word**.**	–
230	REALDMIN	user	0.0	R(r)	**MIN**imum value of **REAL D**. External speed setpoint in % minimum value.	–
231	REALDMAX	user	100.0	R(r)	**MAX**imum value of **REAL D**. External speed setpoint in % maximum value.	–
232	REALEMIN	user	0.0	R(r)	**MIN**imum value of **REAL E**. Used as Nominal current.	–
233	REALEMAX	user	100.0	R(r)	**MAX**imum value of **REAL E**. Used as nominal torque.	–

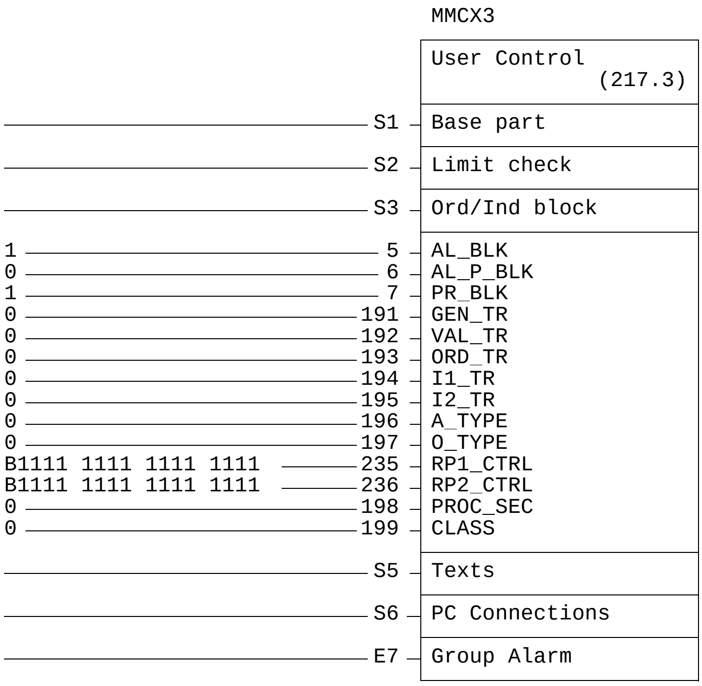
Ord/Ind block



Terminal Description, Ord/Ind block

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
128	I1_EVBLK	user	H’FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **1**. New value can be entered as a hexadecimal string, eg. H’0000, or as a binary string, for example B0000 0000 0000 0000.	–
145	I2_EVBLK	user	H'FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **2**. New value can be entered as a hexadecimal string, eg. H'0000, or as a binary string, for example B0000 0000 0000 0000.	–

Event treat



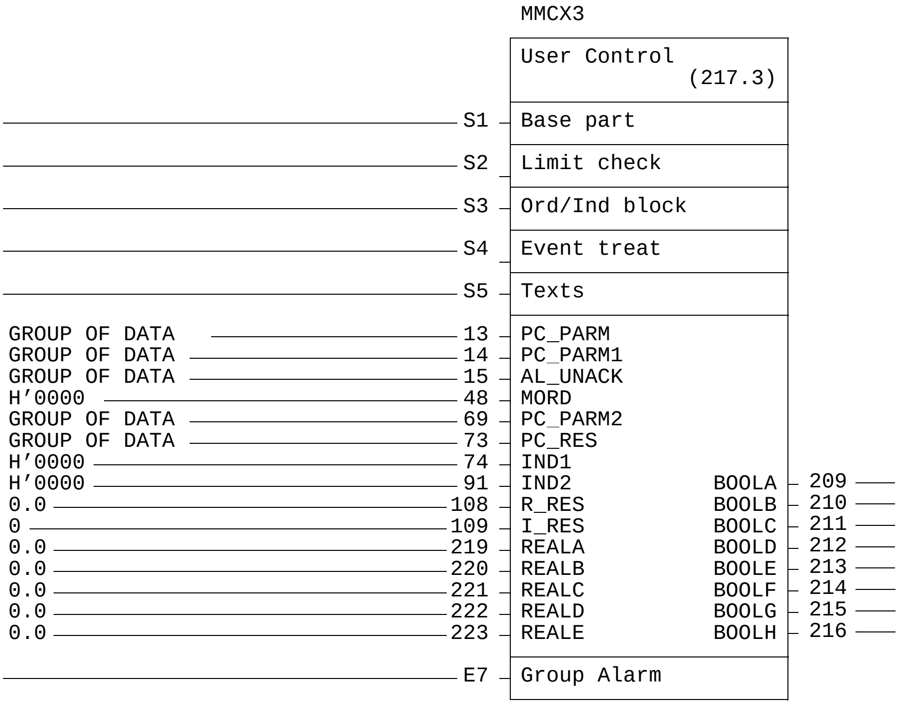
Terminal Description, Event treat

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
5	AL_BLK	dialog	1	–	**BL**ocKing of **AL**arms to alarm list.	–
6	AL_P_BLK	system	0	B(r/w)	**AL**arm **P**eriod **BL**oc**K** flag for temporary blocking of alarm indication and event handling in Operator Station by PC program.	–
7	PR_BLK	dialog	1	–	**BL**oc**K**ing of alarms to **PR**inter and other units.	–
191	GEN_TR	user	0	–	The **GEN**eral **TR**eatment terminal assigns item numbers for event handling of ALARM BLocK orders and PRINT BLocK orders.	Not used in DRICONE.
192	VAL_TR	user	0	–	**VAL**ue **TR**eatment. Item numbers for event treatment of REAL PARAM orders, INTL PARAM orders, REAL RES LOLIM orders and REAL RES HILIM orders.	Not used in DRICONE.

Terminal Description, Event treat (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
193	ORD_TR	user	0	–	The manual **ORD**er **TR**eatment terminal assigns item numbers for event handling of manual orders MORD_00 - MORD_15.	Not used in DRICONE.
194	I1_TR	user	0	–	The **I**ndication **TR**eatment of IND**1** specifies which EVENT TREAT data base element is to be used in the Operator Station.	336 Used for additional DRICONE alarms for ACS type of Drives. 342 for DCS type of Drives.
195	I2_TR	user	0	–	The **I**ndication **TR**eatment of IND**2** specifies which EVENT TREAT data base element is to be used in the Operator Station.	337 Used for additional DRICONE alarms for ACS type of Drives. 343 for DCS type of Drives.
196	A_TYPE	user	0	–	**A**nalyse **TYPE**. 0=Error handling of IND1 and IND2 in Operator Station 1=No error handling of IND1 or IND2 except for IND1_08.	–
197	O_TYPE	user	0	–	**O**rder **TYPE**.	Always set to 0.
235	RP1_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 1** blocks error in the corresponding bit of the IND1. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
236	RP2_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 2** blocks error in the corresponding bit of the IND2. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
198	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16. 0=no sectioning. The signal may be presented in lists –1=the signal can't be selected and can't be presented in lists.	–
199	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

PC Connections



Terminal Description, PC Connections

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
14	PC_PARM1	system	–	A24(r/w)	Group data to be connected to the **PCPAR1** terminal of the MMC-ORD PC element.	–
15	AL_UNACK	system	–	IL(r/w)	Group data over **UNACK**nowledged **AL**arms.	–
48	MORD	dialog and PC	–	I(r/w)	Group data for **M**anual **ORD**ers from the operator. Used for acknowledge from PC.	–
69	PC_PARM2	system	–	A10(r/w)	Group data to be connected to the **PCPAR2** terminal of the MMC-IND PC element.	–
73	PC_RES	PC	–	A12(r/w)	The **PC RES**ult terminal contains group data (indications) to be connected from the PCRES terminal of the MMC-IND PC element.	–

Terminal Description, PC Connections (Continued)

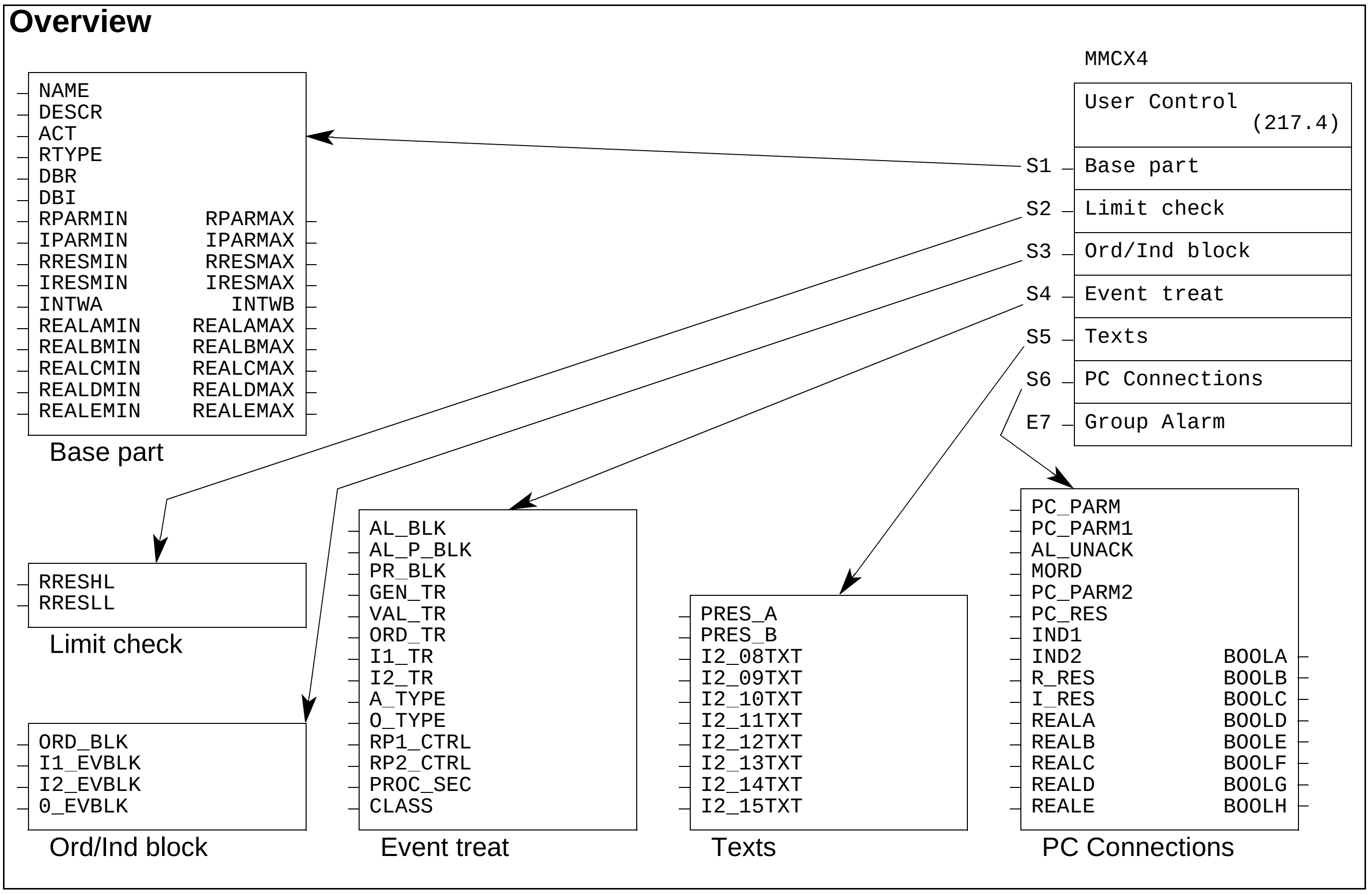
Terminal No	**Terminal Name**	**Value entered by**	**Default value**	**PC connection data type**	**Description**	**Remarks**
74	IND1	system	–	I(r/w)	The **IND**ication **1** terminal contains status indications from PC.	Fault word 1
91	IND2	system	–	I(r/w)	The **IND**ication **2** terminal contains status indications from PC.	Fault word 2
222	REALD	PC	0.0	R(r/w)	**REAL D**. External speed setpoint in rpm value.	–
223	REALE	PC	0.0	R(r/w)	**REAL E**. Nominal power value.	–

User Control for DRICONE alarm DB-element MMCX

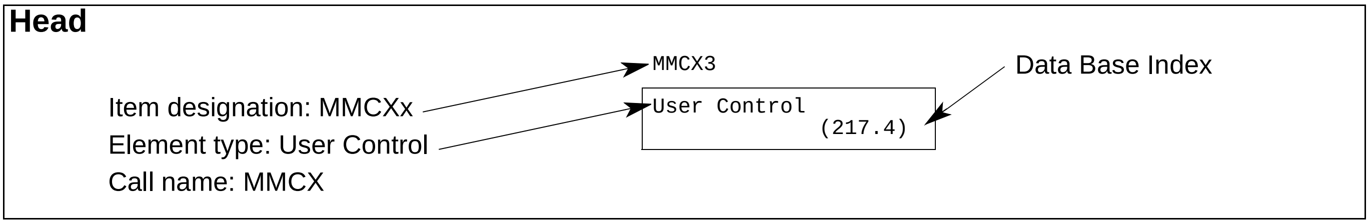
Summary for MMCX4

The help DRICONE DB-element stores additional alarm information. The termianls which are really used are only described.

Parameters that can be changed from the dialog can be given start values.

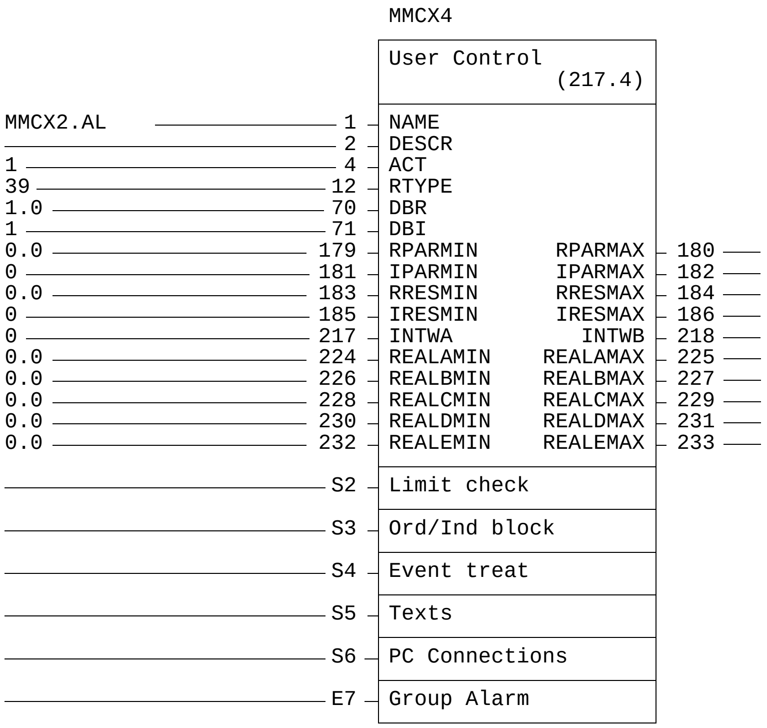


Overview



Head

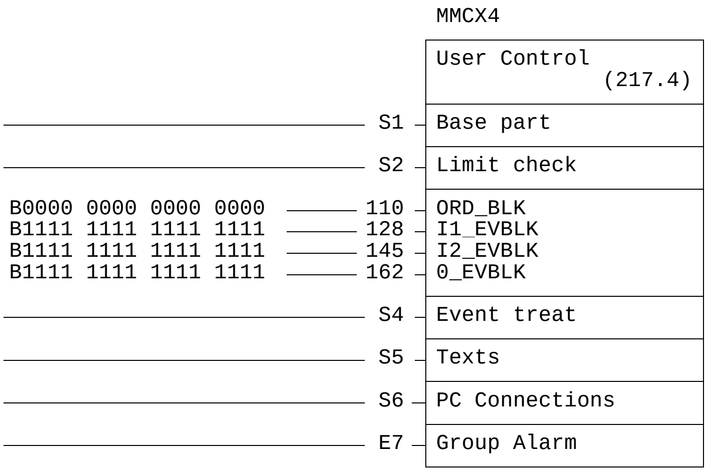
Base part


MMCX4
User Control
(217.4)
MMCX2.AL 1 NAME
2 DESCR
1 4 ACT
39 12 RTYPE
1.0 70 DBR
1 71 DBI
0.0 179 RPARMIN RPARMAX 180
0 181 IPARMIN IPARMAX 182
0.0 183 RRESMIN RRESMAX 184
0 185 IRESMIN IRESMAX 186
0 217 INTWA INTWB 218
0.0 224 REALAMIN REALAMAX 225
0.0 226 REALBMIN REALBMAX 227
0.0 228 REALCMIN REALCMAX 229
0.0 230 REALDMIN REALDMAX 231
0.0 232 REALEMIN REALEMAX 233
S2 Limit check
S3 Ord/Ind block
S4 Event treat
S5 Texts
S6 PC Connections
E7 Group Alarm

Terminal Description, Base part

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
1	NAME	user	MMCXx	–	Each Drive object must be given a unique **NAME**. For example ABC 123.	Max. 20 characters. Spaces are not allowed. The name must be the same as the main DRICONE DB-element plus the extension **.AL**
2	DESCR	user	–	–	**DESCR**iption of the Drive object that is shown in Operator Station.	Max. 20 characters. Any information regarding the Drive object may be entered.
4	ACT	user	1	B(r/w)	1=operator communication is **ACT**ive.	0=communication is blocked and events are not updated.
12	RTYPE	user	39	–	**R**eference **TYPE** for GROUP.	49 Used for functional unit DRICONE.

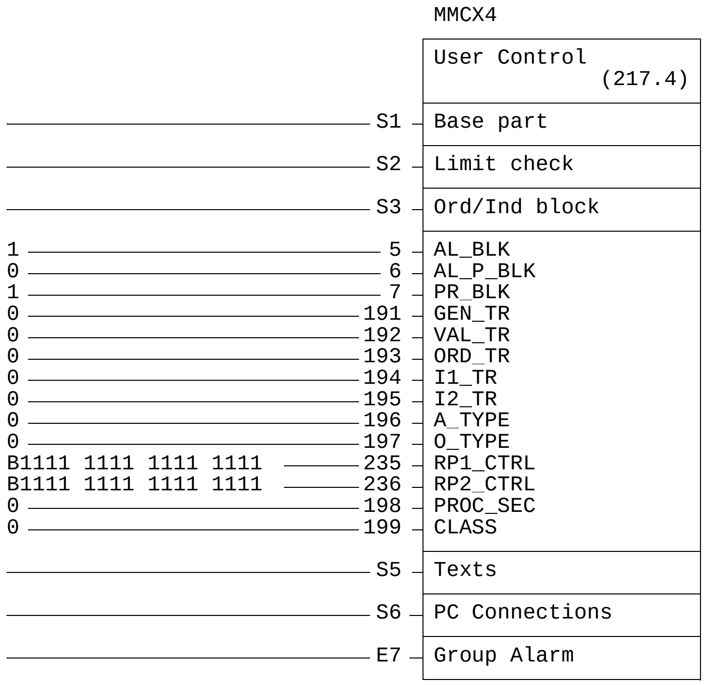
Ord/Ind block



Terminal Description, Ord/Ind block

Terminal No	**Terminal Name**	**Value entered by**	**Default value**	**PC connection data type**	**Description**	**Remarks**
128	I1_EVBLK	user	H'FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **1**. New value can be entered as a hexadecimal string, eg. H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
145	I2_EVBLK	user	H'FFFF	I(r/w)	**BL**oc**K**ing of **I**ndication **EV**ents **2**. New value can be entered as a hexadecimal string, eg. H'0000, or as a binary string, for example B0000 0000 0000 0000.	–

Event treat



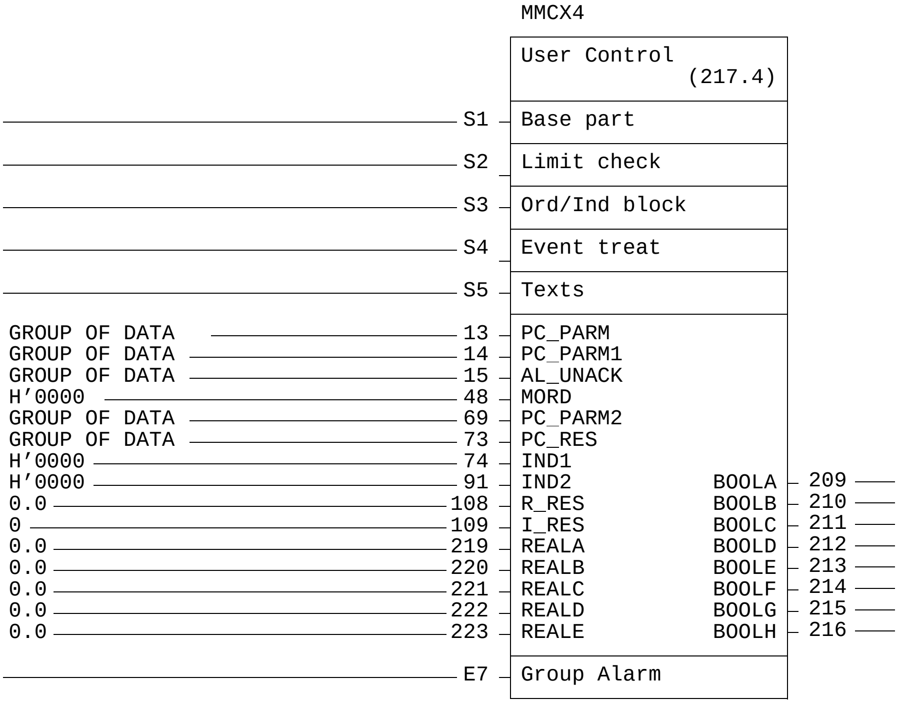
Terminal Description, Event treat

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
5	AL_BLK	dialog	1	–	**BL**ocKing of **AL**arms to alarm list.	–
6	AL_P_BLK	system	0	B(r/w)	**AL**arm **P**eriod **BL**oc**K** flag for temporary blocking of alarm indication and event handling in Operator Station by PC program.	–
7	PR_BLK	dialog	1	–	**BL**oc**K**ing of alarms to **PR**inter and other units.	–
191	GEN_TR	user	0	–	The **GEN**eral **TR**eatment terminal assigns item numbers for event handling of ALARM BLocK orders and PRINT BLocK orders.	Not used in DRICONE.
192	VAL_TR	user	0	–	**VAL**ue **TR**eatment. Item numbers for event treatment of REAL PARAM orders, INTL PARAM orders, REAL RES LOLIM orders and REAL RES HILIM orders.	Not used in DRICONE.

Terminal Description, Event treat (Continued)

Terminal No	**Terminal Name**	**Value entered by**	**Default value**	**PC connection data type**	**Description**	**Remarks**
193	ORD_TR	user	0	–	The manual **ORD**er **TR**eatment terminal assigns item numbers for event handling of manual orders MORD_00 - MORD_15.	Not used in DRICONE.
194	I1_TR	user	0	–	The **I**ndication **TR**eatment of IND**1** specifies which EVENT TREAT data base element is to be used in the Operator Station.	338 Used for additional DRICONE alarms for ACS type of Drives. 344 for DCS type of Drives
195	I2_TR	user	0	–	The **I**ndication **TR**eatment of IND**2** specifies which EVENT TREAT data base element is to be used in the Operator Station.	339 Used for additional DRICONE alarms for ACS type of Drives. 345 for DCS type of Drives
196	A_TYPE	user	0	–	**A**nalyse **TYPE**. 0=Error handling of IND1 and IND2 in Operator Station 1=No error handling of IND1 or IND2 except for IND1_08.	–
197	O_TYPE	user	0	–	**O**rder **TYPE**.	Always set to 0.
235	RP1_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 1** blocks error in the corresponding bit of the IND1. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
236	RP2_CTRL	user	H'FFFF	–	Every bit of the value **R**e**P**eat **C**on**TR**o**L 2** blocks error in the corresponding bit of the IND2. New value can be entered as a hexadecimal string, for example H'0000, or as a binary string, for example B0000 0000 0000 0000.	–
198	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16. 0=no sectioning. The signal may be presented in lists –1=the signal can't be selected and can't be presented in lists.	–
199	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

PC Connections



Terminal Description, PC Connections

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
14	PC_PARM1	system	–	A24(r/w)	Group data to be connected to the **PCPAR1** terminal of the MMC-ORD PC element.	–
15	AL_UNACK	system	–	IL(r/w)	Group data over **UNACK**nowledged **AL**arms.	–
48	MORD	dialog and PC	–	I(r/w)	Group data for **M**anual **ORD**ers from the operator. Used for acknowledge from PC.	–
69	PC_PARM2	system	–	A10(r/w)	Group data to be connected to the **PCPAR2** terminal of the MMC-IND PC element.	–
73	PC_RES	PC	–	A12(r/w)	The **PC RES**ult terminal contains group data (indications) to be connected from the PCRES terminal of the MMC-IND PC element.	–

Terminal Description, PC Connections (Continued)

Terminal No	**Terminal Name**	**Value entered by**	**Default value**	**PC connection data type**	**Description**	**Remarks**
74	IND1	system	–	I(r/w)	The **IND**ication **1** terminal contains status indications from PC.	Alarm word 1
91	IND2	system	–	I(r/w)	The **IND**ication **2** terminal contains status indications from PC.	Alarm word 2

Appendix E Standard Event Texts

E.1 General

This section describes the principles for events and alarms, the standard event texts for DRICONE main data base element and DRICONE fault and alarm data base elements. The section contains also a layout of the Event Treat configuration for DRICONE.

Figure E-1 shows diagrammatically the relation between indications and the parameters which can be used to block event handling for certain indications and points out a required handling in the operator's station.

The possibilities of the operator to block event printouts and alarms are shown under the heading 'Event and alarm blocking' below.

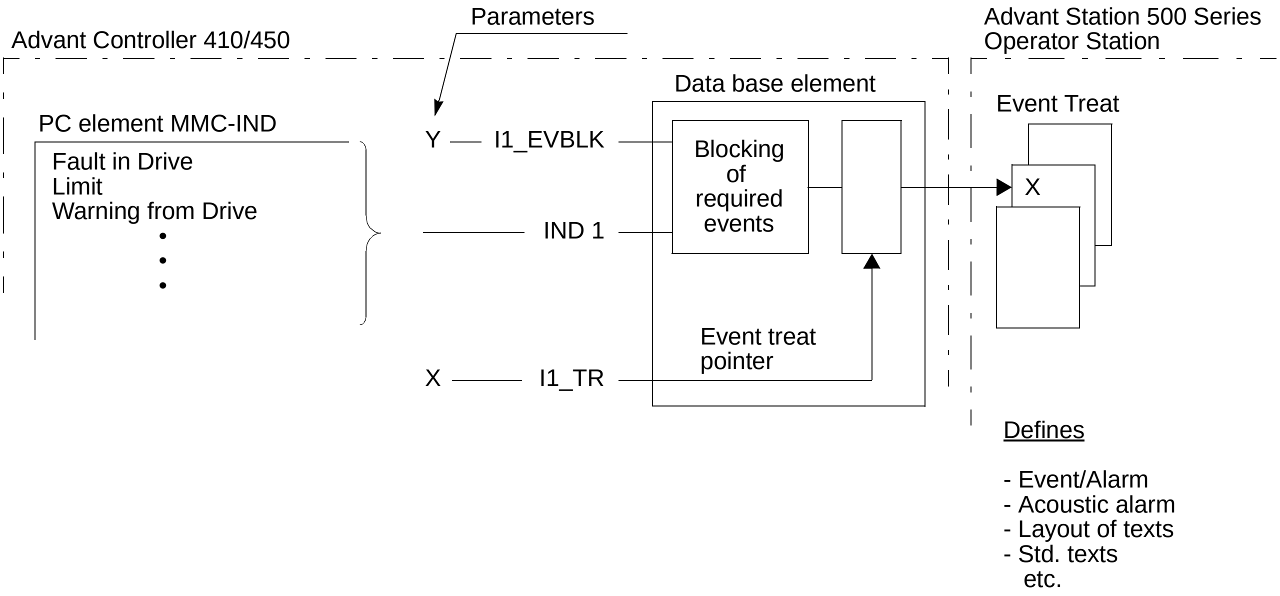


Figure E-1. Event Handling Principles

The events are divided into groups. One pointer is allocated to each group which means that the individual events of the group are, in several respects, handled in the same way in Advant Station 500 Series Operator Station. For each group different handling can be selected for status changes 0-->1 and 1-->0 respectively. The texts which are written out in different lists are individual for each event. The group division - which events are associated with the pointer - is given in 'Event description with standard texts' below. This also specifies which event handling is obtained as default and which alternative standard function.

E.2 Standard Event Text for DRICONE

Table E-1. Event Text for Main MMCX Data Base Element, EVENT Treat element 334 - 335

Signal	**Events**	**Event Treat pointer**	**Property text**		**Event Text**	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_01	Out of window	I1_TR	Speed Outside Window	2	Alarm	1
IND1_01	Within window	I1_TR	Speed Outside Window	2	Normal	2
IND1_02	Emergency stop	I1_TR	Emergency Stop Fault	3	Alarm	1
IND1_02	No Emergency stop	I1_TR	Emergency Stop Fault	3	Normal	2
IND1_04	Run disabled	I1_TR	Run Disabled	5	Alarm	1
IND1_04	Run enabled	I1_TR	Run Disabled	5	Normal	2
IND1_06	First start not done	I1_TR	First start not done	7	Alarm	1
IND1_06	First start done	I1_TR	First start not done	7	Normal	2
IND1_07	Alarm from drive	I1_TR	Alarm from drive	8	Alarm	1
IND1_07	No alarm	I1_TR	Alarm from drive	8	Normal	2
IND1_08	Start inhibition	I1_TR	False Start Inhibit	9	Alarm	1
IND1_08	No start inhibition	I1_TR	False Start Inhibit	9	Normal	2
IND1_09	Limit exceeded	I1_TR	Limit	10	Alarm	1
IND1_09	No Limit	I1_TR	Limit	10	Normal	2
IND1_11	Fault from drive	I1_TR	Fault in Drive	12	Alarm	1
IND1_11	No fault	I1_TR	Fault in Drive	12	Normal	2
IND1_12	Communication fault	I1_TR	Communication Error	13	Alarm	1
IND1_12	Communication fault	I1_TR	Communication Error	13	Normal	2
IND2_00	In service ready to switch on	I2_TR	In service	1	On	1
IND2_00	Not in service	I2_TR	In service	1	Off	2
IND2_01	Drive ready to start	I2_TR	Ready to Start	2	On	1
IND2_01	Drive is not ready to start	I2_TR	Ready to Start	2	Off	2
IND2_02	Running with selected reference	I2_TR	Run	3	On	1

Table E-1. Event Text for Main MMCX Data Base Element, EVENT Treat element 334 - 335 (Continued)

IND2_02	Stopped	I2_TR	Run	3	Off	2
IND2_03	Motor is magnetized	I2_TR	Motor Magnetized	4	On	1
IND2_03	Motor is not magnetized	I2_TR	Motor Magnetized	4	Off	2
IND2_04	OFF 2	I2_TR	Emergency	5	On	5
IND2_04	No OFF 2	I2_TR	Emergency	5	Off	6
IND2_05	OFF 3	I2_TR	Emergency stop	6	On	5
IND2_05	No OFF 3	I2_TR	Emergency stop	6	Off	6
IND2_06	Switch on is inhibited	I2_TR	Inhibit Switch On	7	Yes	3
IND2_06	Switch on is not inhibited	I2_TR	Inhibit Switch On	7	No	4
IND2_07	Drive runs at setpoint	I2_TR	At Setpoint	8	On	1
IND2_07	Drive is not at setpoint	I2_TR	At Setpoint	8	Off	2
IND2_08	C-Interlock	I2_TR	C-Interlock	9	On	1
IND2_08	C-Interlock	I2_TR	C-Interlock	9	Off	2
IND2_09	Drive runs remotely controlled	I2_TR	Remote	10	On	1
IND2_09	Drive runs locally controlled	I2_TR	Remote	10	Off	2
IND2_10	B-Interlock 1	I2_TR	B-Interlock 1	11	On	1
IND2_10	B-Interlock 1	I2_TR	B-Interlock 1	11	Off	2
IND2_11	B-Interlock 2	I2_TR	B-Interlock 2	12	On	1
IND2_11	B-Interlock 2	I2_TR	B-Interlock 2	12	Off	2
IND2_12	B-Interlock 3	I2_TR	B-Interlock 3	13	On	1
IND2_12	B-Interlock 3	I2_TR	B-Interlock 3	13	Off	2
IND2_13	B-Interlock 4	I2_TR	B-Interlock 4	14	On	1
IND2_13	B-Interlock 4	I2_TR	B-Interlock 4	14	Off	2
IND2_14	A-Interlock	I2_TR	A-Interlock	15	On	1
IND2_14	A-Interlock	I2_TR	A-Interlock	15	Off	2
IND2_15	Override interlock	I2_TR	Override Interlock	16	On	1
IND2_15	Don't override interlock	I2_TR	Override Interlock	16	Off	2

Table E-2. Event Text for Fault MMCX Data Base Element ACS type of Drive, EVENT Treat element 336 - 337

Signal	**Events**	**Event Treat pointer**	**Property text**		**Event Text**	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_00	Short circuit	I1_TR	Short Circuit	1	Fault	1
IND1_00	Short circuit	I1_TR	Short Circuit	1	Normal	2
IND1_01	Over current	I1_TR	Over Current	2	Fault	1
IND1_01	Over current	I1_TR	Over Current	2	Normal	2
IND1_02	DC over voltage fault	I1_TR	DC Over Voltage	3	Fault	1
IND1_02	No DC over voltage fault	I1_TR	DC Over Voltage	3	Normal	2
IND1_03	Power plate over temperature fault	I1_TR	Over Temp Pow Plate	4	Fault	1
IND1_03	No power plate over temperature fault	I1_TR	Over Temp Pow Plate	4	Normal	2
IND1_04	Earth fault	I1_TR	Earth Fault	5	Fault	1
IND1_04	No earth fault	I1_TR	Earth Fault	5	Normal	2
IND1_05	Motor over temperature fault	I1_TR	Over Temp Motor	6	Fault	1
IND1_05	No motor over temperature fault	I1_TR	Over Temp Motor	6	Normal	2
IND1_06	Motor over load fault	I1_TR	Over Load Motor	7	Fault	1
IND1_06	No motor over load fault	I1_TR	Over Load Motor	7	Normal	2
IND1_07	System fault	I1_TR	System Fault	8	Fault	1
IND1_07	No system fault	I1_TR	System Fault	8	Normal	2
IND1_08	Under load fault	I1_TR	Under Load	9	Fault	1
IND1_08	No under load fault	I1_TR	Under Load	9	Normal	2
IND1_09	Over speed fault	I1_TR	Over Speed	10	Fault	1
IND1_09	No over speed fault	I1_TR	Over Speed	10	Normal	2
IND1_10	Supply Section fault	I1_TR	Supply Section	11	Fault	1
IND1_10	No Supply Section fault	I1_TR	Supply Section	11	Normal	2
IND1_11	Master/Follower fault	I1_TR	Master/Follower	12	Fault	1

Table E-2. Event Text for Fault MMCX Data Base Element ACS type of Drive, EVENT Treat element 336 - 337 (Continued)

IND1_11	No Master/Follower fault	I1_TR	Master/Follower	12	Normal	2
IND1_12	Short circuit INT1	I1_TR	Short circuit INT1	13	Fault	1
IND1_12	No Short circuit INT1	I1_TR	Short Circuit Int1	13	Normal	2
IND1_13	Short circuit INT2	I1_TR	Short Circuit Int2	14	Fault	1
IND1_13	No Short circuit INT2	I1_TR	Short Circuit Int2	14	Normal	2
IND1_14	Short circuit INT3	I1_TR	Short Circuit Int3	15	Fault	1
IND1_14	No Short circuit INT3	I1_TR	Short Circuit Int3	15	Normal	2
IND1_15	Short circuit INT4	I1_TR	Short Circuit Int4	16	Fault	1
IND1_15	No Short circuit INT4	I1_TR	Short Circuit Int4	16	Normal	2
IND2_00	Supply section fault	I2_TR	Supply Section	1	Fault	1
IND2_00	No supply section fault	I2_TR	Supply Section	1	Normal	2
IND2_02	DC under voltage	I2_TR	DC Under Voltage	3	Fault	1
IND2_02	No DC under voltage	I2_TR	DC Under Voltage	3	Normal	2
IND2_04	Run disabled	I2_TR	Run Disabled	5	Fault	1
IND2_04	Run enabled	I2_TR	Run Disabled	5	Normal	2
IND2_05	Encoder fault	I2_TR	Speed Encoder	6	Fault	1
IND2_05	No encoder fault	I2_TR	Speed Encoder	6	Normal	2
IND2_06	I/O link fault channel 1	I2_TR	I/O Link channel 1	7	Fault	1
IND2_06	No I/O link fault channel 1	I2_TR	I/O Link channel 1	7	Normal	2
IND2_07	Cabinett overtemperature	I2_TR	Cabinett overtemp	8	Fault	1
IND2_07	No Cabinett overtemperature	I2_TR	Cabinett overtemp	8	Normal	2
IND2_09	Over svitching frequency	I2_TR	Over Switching	10	Fault	1
IND2_09	No over switching frequency	I2_TR	Over Switching	10	Normal	2
IND2_11	PPCC link fault	I2_TR	PPCC Link	12	Fault	1
IND2_11	No PPCC link fault	I2_TR	PPCC Link	12	Normal	2
IND2_12	Communication fault Channel 0	I2_TR	Communication Ch 0	13	Fault	1
IND2_12	No Communication fault Channel 0	I2_TR	Communication Ch 0	13	Normal	2
IND2_13	Pannel loss	I2_TR	Pannel loss	14	Fault	1

Table E-2. Event Text for Fault MMCX Data Base Element ACS type of Drive, EVENT Treat element 336 - 337 (Continued)

IND2_13	No pannel loss	I2_TR	Pannel loss	14	Normal	2
IND2_14	Motor stalled	I2_TR	Motor Stalled	15	Fault	1
IND2_14	No motor stalled	I2_TR	Motor Stalled	15	Normal	2
IND2_15	Motor phase missing	I2_TR	Motor Phase Missing	16	Fault	1
IND2_15	No motor phase missing	I2_TR	Motor Phase Missing	16	Normal	2

Table E-3. Event Text for Alarm MMCX Data Base Element ACS type of Drive, EVENT Treat element 338 - 339

Signal	Events	Event Treat pointer	Property text		Event Text	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_00	Prevent unexpected start	I1_TR	Prevent Start	1	Alarm	1
IND1_00	No preventation of unexpected start	I1_TR	Prevent Start	1	Normal	2
IND1_01	Emergency stop	I1_TR	Emergency Stop	2	Alarm	1
IND1_01	Emergency stop	I1_TR	Emergency Stop	2	Normal	2
IND1_02	Measured motor temp alarm	I1_TR	Meas. Motor Temp	3	Alarm	1
IND1_02	Measured motor temp alarm	I1_TR	Meas. Motor Temp	3	Normal	2
IND1_03	Over temperature alarm of the thermal model	I1_TR	Motor Overload	4	Alarm	1
IND1_03	No over temperature alarm of the thermal model	I1_TR	Motor Overload	4	Normal	2
IND1_04	Power plate over temperature alarm	I1_TR	Temp Power Plate	5	Alarm	1
IND1_04	No power plate over temperature alarm	I1_TR	Temp Power Plate	5	Normal	2
IND1_05	Pulse encoder alarm	I1_TR	Pulse Encoder	6	Alarm	1
IND1_05	No Pulse encoder alarm	I1_TR	Pulse Encoder	6	Normal	2
IND1_07	Standard digital I/O alarm	I1_TR	Standard Digital I/O	8	Alarm	1
IND1_07	No Standard digital I/O alarm	I1_TR	Standard Digital I/O	8	Normal	2

Table E-3. Event Text for Alarm MMCX Data Base Element ACS type of Drive, EVENT Treat element 338 - 339 (Continued)

IND1_08	Standard analogue I/O alarm	I1_TR	Standard Analog I/O	9	Alarm	1
IND1_08	No Standard analogue I/O alarm	I1_TR	Standard Analog I/O	9	Normal	2
IND1_09	External digital I/O alarm	I1_TR	Ext. Digital I/O	10	Alarm	1
IND1_09	No External digital I/O alarm	I1_TR	Ext. Digital I/O	10	Normal	2
IND1_10	External analogue I/O alarm	I1_TR	Ext. Analog I/O	11	Alarm	1
IND1_10	No External analogue I/O alarm	I1_TR	Ext. Analog I/O	11	Normal	2
IND1_11	Master - Follower alarm	I1_TR	Master - Follow alarm	12	Alarm	1
IND1_11	Master - Follower alarm	I1_TR	Master - Follow alarm	12	Normal	2
IND1_12	Communication alarm Channel 0	I1_TR	Comm. Channel 0	13	Alarm	1
IND1_12	Communication alarm Channel 0	I1_TR	Comm. Channel 0	13	Normal	2
IND1_14	Earth fault alarm	I1_TR	Earth fault	15	Alarm	1
IND1_14	No Earth fault alarm	I1_TR	Earth fault	15	Normal	2
IND2_00	Power failure	I2_TR	Power Failure	1	Alarm	1
IND2_00	No power failure	I2_TR	Power Failure	1	Normal	2
IND2_01	Under load alarm	I2_TR	Under Load	2	Alarm	1
IND2_01	No under load alarm	I2_TR	Under Load	2	Normal	2
IND2_02	Identity run	I2_TR	Identity run	3	Alarm	1
IND2_02	No Identity run	I2_TR	Identity run	3	Normal	2
IND2_03	DC under voltage alarm	I2_TR	DC Under Voltage	5	Alarm	1
IND2_03	No DC under voltage alarm	I2_TR	DC Under Voltage	5	Normal	2
IND2_04	DC over voltage alarm	I2_TR	DC Over Voltage	5	Alarm	1
IND2_04	No DC over voltage alarm	I2_TR	DC Over Voltage	5	Normal	2
IND2_05	Over current alarm	I2_TR	Over Current	6	Alarm	1
IND2_05	No over current alarm	I2_TR	Over Current	6	Normal	2
IND2_06	Over frequency alarm	I2_TR	Over Frequency	7	Alarm	1
IND2_06	No over frequency alarm	I2_TR	Over Frequency	7	Normal	2

Table E-3. Event Text for Alarm MMCX Data Base Element ACS type of Drive, EVENT Treat element 338 - 339 (Continued)

IND2_07	Power failure file	I2_TR	Power Failure file	8	Alarm	1
IND2_07	No power failure file	I2_TR	Power Failure file	8	Normal	2
IND2_08	Power down file	I2_TR	Power Down file	8	Alarm	1
IND2_07	No power down file	I2_TR	Power Down file	8	Normal	2
IND2_08	Motor stalled alarm	I2_TR	Stall	9	Alarm	1
IND2_08	No motor stalled alarm	I2_TR	Stall	9	Normal	2
IND2_09	Supply phase	I2_TR	Supply Phase	10	Alarm	1
IND2_09	No supply phase missing	I2_TR	Supply Phase	10	Normal	2
IND2_10	Timeout channel 0	I2_TR	DDCS Timeout Ch0	11	Alarm	1
IND2_10	No timeout channel 0	I2_TR	DDCS Timeout Ch0	11	Normal	2
IND2_13	Pannel loss	I2_TR	Pannel loss	14	Alarm	1
IND2_13	No pannel loss	I2_TR	Pannel loss	14	Normal	2

Table E-4. Event Text for Main MMCX Data Base Element DCS type of Drive, EVENT Treat element 340 - 341

Signal	**Events**	**Event Treat pointer**	**Property text**		**Event Text**	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_07	Alarm from drive	I1_TR	Alarm from drive	8	Alarm	1
IND1_07	No alarm	I1_TR	Alarm from drive	8	Normal	2
IND1_11	Fault from drive	I1_TR	Fault in Drive	12	Alarm	1
IND1_11	No fault	I1_TR	Fault in Drive	12	Normal	2
IND1_12	Communication fault	I1_TR	Communication Error	13	Alarm	1
IND1_12	Communication fault	I1_TR	Communication Error	13	Normal	2
IND2_00	In service ready to switch on	I2_TR	In service	1	On	1
IND2_00	Not in service	I2_TR	In service	1	Off	2
IND2_01	Drive ready to start	I2_TR	Ready to Start	2	On	1
IND2_01	Drive is not ready to start	I2_TR	Ready to Start	2	Off	2
IND2_02	Running with selected reference	I2_TR	Run	3	On	1

Table E-4. Event Text for Main MMCX Data Base Element DCS type of Drive, EVENT Treat element 340 - 341

IND2_02	Stopped	I2_TR	Run	3	Off	2
IND2_08	C-Interlock	I2_TR	C-Interlock	9	On	1
IND2_08	C-Interlock	I2_TR	C-Interlock	9	Off	2
IND2_10	B-Interlock 1	I2_TR	B-Interlock 1	11	On	1
IND2_10	B-Interlock 1	I2_TR	B-Interlock 1	11	Off	2
IND2_11	B-Interlock 2	I2_TR	B-Interlock 2	12	On	1
IND2_11	B-Interlock 2	I2_TR	B-Interlock 2	12	Off	2
IND2_12	B-Interlock 3	I2_TR	B-Interlock 3	13	On	1
IND2_12	B-Interlock 3	I2_TR	B-Interlock 3	13	Off	2
IND2_13	B-Interlock 4	I2_TR	B-Interlock 4	14	On	1
IND2_13	B-Interlock 4	I2_TR	B-Interlock 4	14	Off	2
IND2_14	A-Interlock	I2_TR	A-Interlock	15	On	1
IND2_14	A-Interlock	I2_TR	A-Interlock	15	Off	2
IND2_15	Override interlock	I2_TR	Override Interlock	16	On	1
IND2_15	Don't override interlock	I2_TR	Override Interlock	16	Off	2

Table E-5. Event Text for Fault MMCX Data Base Element DCS type of Drive, EVENT Treat element 342 - 343

Signal	**Events**	**Event Treat pointer**	**Property text**		**Event Text**	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_00	Auxiliary under voltage	I1_TR	Auxil. Undervoltage	1	Fault	1
IND1_00	Auxiliary under voltage	I1_TR	Auxil. Undervoltage	1	Normal	2
IND1_01	Over current	I1_TR	Over Current	2	Fault	1
IND1_01	No Over current	I1_TR	Over Current	2	Normal	2
IND1_02	Armature over voltage fault	I1_TR	Armature Overvolt.	3	Fault	1
IND1_02	No Armature over voltage fault	I1_TR	Armature Overvolt.	3	Normal	2
IND1_03	Converter over temperature fault	I1_TR	Overtemp Conv.	4	Fault	1
IND1_03	No converter over temperature fault	I1_TR	Overtemp Conv.	4	Normal	2

Table E-5. Event Text for Fault MMCX Data Base Element DCS type of Drive, EVENT Treat element 342 - 343 (Continued)

IND1_04	Earth fault	I1_TR	Earth fault	5	Fault	1
IND1_04	No earth fault	I1_TR	Earth fault	5	Normal	2
IND1_05	Motor 1 over temperature fault	I1_TR	Motor 1 overtemp	6	Fault	1
IND1_05	No over temperature fault motor 1	I1_TR	Motor 1 overtemp	6	Normal	2
IND1_06	Motor 1 over load fault	I1_TR	Motor 1 overload	7	Fault	1
IND1_06	No over load fault motor 1	I1_TR	Motor 1 overload	7	Normal	2
IND1_07	I/O-board not found	I1_TR	I/O-board not found	8	Fault	1
IND1_07	I/O-board found	I1_TR	I/O-board not foundt	8	Normal	2
IND1_08	Motor 2 over temperature fault	I1_TR	Motor 2 overtemp	9	Fault	1
IND1_08	No over temperature fault motor 2	I1_TR	Motor 2 overtemp	9	Normal	2
IND1_09	Motor 2 over load fault	I1_TR	Motor 2 overload	10	Fault	1
IND1_09	No over load fault motor 2	I1_TR	Motor 2 overload	10	Normal	2
IND1_11	Main supply under voltage	I1_TR	Mains undervoltage	12	Alarm	1
IND1_11	No main supply under voltage	I1_TR	Mains undervoltage	12	Normal	2
IND1_12	Main supply over voltage	I1_TR	Mains overvoltage	13	Fault	1
IND1_12	No main supply over voltage	I1_TR	Mains overvoltage	13	Normal	2
IND1_13	Not synchronized	I1_TR	Synchronism	14	Fault	1
IND1_13	Synchronized	I1_TR	Synchronism	14	Normal	2
IND1_14	Field exciter 1 over current	I1_TR	Fld ex 1 overcurrent	15	Fault	1
IND1_14	No over current field exciter 1	I1_TR	Fld ex 1 overcurrent	15	Normal	2
IND1_15	Field exciter 1 communication fault	I1_TR	Fld ex 1 commerror	16	Fault	1
IND1_15	No communication fault field exciter 1	I1_TR	Fld ex 1 commerror	16	Normal	2
IND2_00	Armature current ripple	I2_TR	Arm current ripple	1	Fault	1
IND2_00	No armature current ripple	I2_TR	Arm current ripple	1	Normal	2
IND2_01	Field exciter 2 over current	I1_TR	Fld ex 2 overcurrent	2	Fault	1

Table E-5. Event Text for Fault MMCX Data Base Element DCS type of Drive, EVENT Treat element 342 - 343 (Continued)

IND2_01	No over current field exciter 2	I1_TR	Fld ex 2 overcurrent	2	Normal	2
IND2_02	Field exciter 2 communication fault	I1_TR	Fld ex 2 commerror	3	Fault	1
IND2_02	No communication fault field exciter 2	I1_TR	Fld ex 2 commerror	3	Normal	2
IND2_03	Phase sequence fault	I2_TR	Phase sequence	4	Fault	1
IND2_03	No phase sequence fault	I2_TR	Phase sequence	4	Normal	2
IND2_04	No field acknowledge	I2_TR	Field acknowledge	5	Fault	1
IND2_04	Field acknowledge	I2_TR	Field acknowledge	5	Normal	2
IND2_05	Measured speed fault	I2_TR	Speed measured	6	Fault	1
IND2_05	No measured speed fault	I2_TR	Speed measured	6	Normal	2
IND2_06	No external fan acknowledge	I2_TR	Ext. Fan acknowledge	7	Fault	1
IND2_06	External fan acknowledge	I2_TR	Ext. Fan acknowledge	7	Normal	2
IND2_07	No main contactor acknowledge	I2_TR	Main cont ack	8	Fault	1
IND2_07	Main contactor acknowledge	I2_TR	Main cont ack	8	Normal	2
IND2_08	Type coding fault	I2_TR	Type coding	9	Fault	1
IND2_08	No type coding fault	I2_TR	Type coding	9	Normal	2
IND2_09	Parameter backup fault	I2_TR	Par backup	10	Fault	1
IND2_09	No parameter backup fault	I2_TR	Par backup	10	Normal	2
IND2_10	No central fan acknowledge	I2_TR	C Fan ack	11	Fault	1
IND2_10	Central fan acknowledge	I2_TR	C Fan ack	11	Normal	2
IND2_11	DDCS ch. 0 communication fault	I2_TR	DDCS Comm. Ch 0.	12	Fault	1
IND2_11	No DDCS ch. 0 communication faultr	I2_TR	DDCS Comm. Ch 0.	12	Normal	2
IND2_12	Field exciter 1 fault	I1_TR	Fld ex 1	13	Fault	1
IND2_12	Field exciter 1 ok	I1_TR	Fld ex 1	13	Normal	2
IND2_13	Field exciter 2 fault	I1_TR	Fld ex 2	14	Fault	1
IND2_13	Field exciter 2 ok	I1_TR	Fld ex 2	14	Normal	2

Table E-5. Event Text for Fault MMCX Data Base Element DCS type of Drive, EVENT Treat element 342 - 343 (Continued)

IND2_14	Motor stalled	I2_TR	Motor stalled	15	Fault	1
IND2_14	No motor stall	I2_TR	Motor stalled	15	Normal	2
IND2_15	Motor over speed	I2_TR	Motor overspeed	16	Fault	1
IND2_15	No motor over speed	I2_TR	Motor overspeed	16	Normal	2

Table E-6. Event Text for Alarm MMCX Data Base Element DCS type of Drive, EVENT Treat element 344 - 345

Signal	**Events**	**Event Treat pointer**	**Property text**		**Event Text**	
			Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
IND1_00	Prevent unexpected start	I1_TR	Prevent Start	1	Alarm	1
IND1_00	No preventation of unexpected start	I1_TR	Prevent Start	1	Normal	2
IND1_01	Emergency stop	I1_TR	Emergency Stop	2	Alarm	1
IND1_01	Emergency stop	I1_TR	Emergency Stop	2	Normal	2
IND1_02	Motor 1 over temperature alarm	I1_TR	Motor 1 Temp	3	Alarm	1
IND1_02	No over temperature alarm motor 1	I1_TR	Motor 1 Temp	3	Normal	2
IND1_03	Motor 1 over load alarm	I1_TR	Motor 1 Overload	4	Alarm	1
IND1_03	No over load alarmmotor 1	I1_TR	Motor 1 Overload	4	Normal	2
IND1_04	Converter over temperature alarm	I1_TR	Conv. Overtemp	5	Alarm	1
IND1_04	No converter over temperature alarm	I1_TR	Conv. Overtemp	5	Normal	2
IND1_05	Register Blocked alarm	I1_TR	Register Blocked	6	Alarm	1
IND1_05	No Register Blocked alarm	I1_TR	Register Blocked	6	Normal	2
IND1_07	RAM backup alarm	I1_TR	RAM backup	8	Alarm	1
IND1_07	No RAM backup alarm	I1_TR	RAM backup	8	Normal	2
IND1_08	Motor 2 over temperature alarm	I1_TR	Motor 2 Temp	9	Alarm	1

Table E-6. Event Text for Alarm MMCX Data Base Element DCS type of Drive, EVENT Treat element 344 - 345 (Continued)

IND1_08	No over temperature alarm motor 2	I1_TR	Motor 2 Temp	9	Normal	2
IND1_09	Motor 2 over load alarm	I1_TR	Motor 2 Overload	10	Alarm	1
IND1_09	No over load alarmmotor 2	I1_TR	Motor 2 Overload	10	Normal	2
IND1_10	Main supply under voltage	I1_TR	Mains undervoltage	11	Alarm	1
IND1_10	No main supply under voltage	I1_TR	Mains undervoltage	11	Normal	2
IND1_12	Converter Fan alarm	I1_TR	Converter Fan	13	Alarm	1
IND1_12	No Converter Fan alarm	I1_TR	Converter Fan	13	Normal	2
IND1_13	Armature current deviation alarm	I1_TR	Armature current dev.	14	Alarm	1
IND1_13	No armature current deviation alarm	I1_TR	Armature current dev.	14	Normal	2
IND1_15	External fan acknowledge alarm	I2_TR	External Fan	16	Alarm	1
IND1_15	No external fan acknowledge alarm	I2_TR	External Fan	16	Normal	2
IND2_00	Pannel loss alarm	I2_TR	Pannel loss	1	Alarm	1
IND2_00	No pannel loss alarm	I2_TR	Pannel loss	1	Normal	2
IND2_01	Type code changed alarm	I2_TR	Type code changed	2	Alarm	1
IND2_01	No type code changed alarm	I2_TR	Type code changed	2	Normal	2
IND2_02	Init values read, S2 alarm	I2_TR	Init values read, S2	3	Alarm	1
IND2_02	No init values read, S2 alarm	I2_TR	Init values read, S2	3	Normal	2
IND2_03	Parameter set 2 missing alarm	I2_TR	Param set 2 missing	4	Alarm	1
IND2_03	Parameter set 2 not missing	I2_TR	Param set 2 missing	4	Normal	2
IND2_04	Backup not allowed alarm	I2_TR	Backup not allowed	5	Alarm	1
IND2_04	Backup allowed	I2_TR	Backup not allowed	5	Normal	2
IND2_05	Write backup alarm	I2_TR	Write backup	6	Alarm	1
IND2_05	No write backup alarm	I2_TR	Write backup	6	Normal	2

The Event Treat data base element in the Advant Station 500 Series of Operator Station has a predefined configuration shown in Table E-7.

Table E-7. Predefined Event Treat for DRICONE

Property	**EVENT**											
	334	**335**	**336**	**337**	**338**	**339**	**340**	**341**	**342**	**343**	**344**	**345**
AUDIBLE	1	0	1	1	1	1	1	0	1	1	1	1
AL_PRIO	2	4	2	2	2	2	2	4	2	2	2	2
AL_TOBLK	0	1	0	0	0	0	0	1	0	0	0	0
AL_FRBLK	1	1	1	1	1	1	1	1	1	1	1	1
PERSISTB	0	1	0	0	0	0	0	1	0	0	0	0
TEXT_TOB	0	0	0	0	0	0	0	0	0	0	0	0
TEXT_FRB	0	0	0	0	0	0	0	0	0	0	0	0
TEXTCOMB	17	17	17	17	17	17	17	17	17	17	17	17

Appendix F PC-program example

F.1 General

The PC-program in this appendix shows an example of the implementation of the DRICONE functional unit control functions. The implementation is divided in several sub-functions. Each sub-function is located on one or several pages of PC-diagram. Below is a short description of each sub-function, and an overview block diagram showing the interconnections between sub-functions.

- Input terminals.

  All input terminals of the DRICONE control function are connected to MOVE-elements here. All internal connections are made to the outputs of these MOVE-elements.

- Operator interface, input.

  All orders, setpoint values, etc. are read from the data base .All internal connections are made to the outputs here.

- Visibility.

  The visibility of current values in operator displays are set according to configuration parameters. Visibility is changed according to control mode input.

- Read from drive.

  All status and current values are read from the drive unit and converted to real value representation.

- Point of control.

  Operator changes of point of control and status changes in the drive unit are evaluated. The current point of control is changed if appropriate.

- Interlocks.

  Interlock inputs are evaluated. The current interlock status is changed if appropriate.

- Start/stop.

  Operator and input start/stop orders are evaluated. The drive is started or stopped according to point of control and current interlock status.

- Sending to drive.

  Orders and setpoint values are sent to the drive unit.

- Operator interface, output.

  All current values, point of control, interlock status etc. are read from the data base. All internal connections are made to the outputs here.

- Output terminals.

  All output terminals of the DRICONE control function are connected to MOVE-elements here. All internal connections are made to the inputs of these MOVE-elements.

F.2 Overview Block Diagram

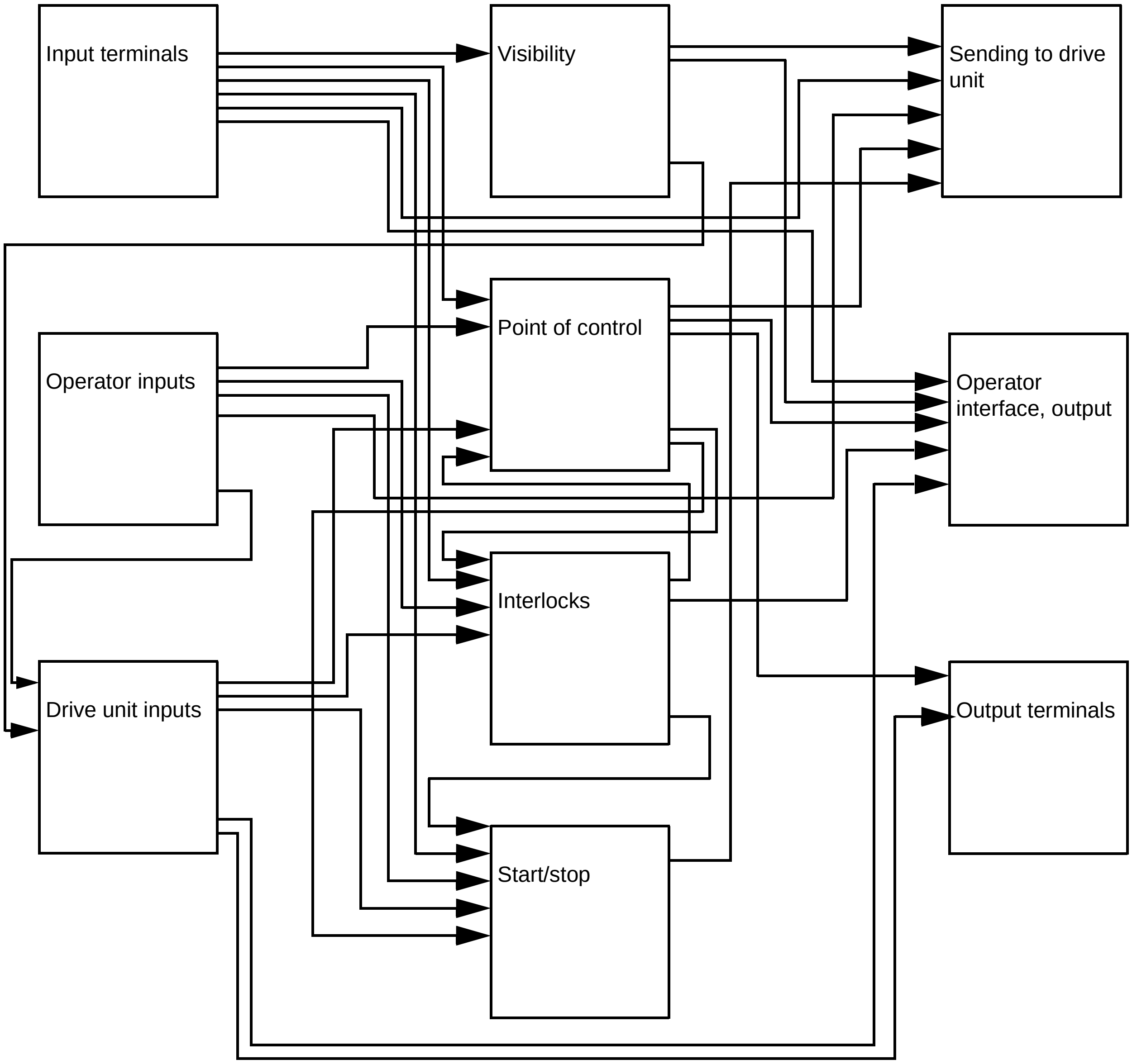


Figure F-1. Overview Diagram.

F.3 Explanation of PC Names

Table F-1. PC Names

PC name	Explanation
(<DRIVE_NAME>_ACUR)	Actual current
(<DRIVE_NAME>_AIA)	Sequence interlock A active
(<DRIVE_NAME>_AIB1)	Process interlock B1 active
(<DRIVE_NAME>_AIB2)	Process interlock B2 active
(<DRIVE_NAME>_AIB3)	Process interlock B3 active
(<DRIVE_NAME>_AIB4)	Process interlock B4 active
(<DRIVE_NAME>_ALM1)	Alarmword 1
(<DRIVE_NAME>_ALM2)	Alarmword 2
(<DRIVE_NAME>_ALU)	Unacknowledged alarm
(<DRIVE_NAME>_ASPE)	Actual speed
(<DRIVE_NAME>_ASTA)	Input auto start
(<DRIVE_NAME>_ASTO)	Input auto stop
(<DRIVE_NAME>_ATQ)	Actual torque
(<DRIVE_NAME>_AUTO)	Point of control central auto active
(<DRIVE_NAME>_AUXS)	Auxilary status word
(<DRIVE_NAME>_BLIL)	Block interlocks
(<DRIVE_NAME>_CENT)	Point of control central active
(<DRIVE_NAME>_CERR)	Drive unit communication error
(<DRIVE_NAME>_CTRM)	Drive unit control mode
(<DRIVE_NAME>_CURM)	Current max. value
(<DRIVE_NAME>_D1ST)	First start of drive not done
(<DRIVE_NAME>_DALI)	Drive above limit
(<DRIVE_NAME>_DALM)	Drive alarm
(<DRIVE_NAME>_DASP)	Drive at setpoint
(<DRIVE_NAME>_DATQ)	Terminal actual torque
(<DRIVE_NAME>_DCUR)	Drive current
(<DRIVE_NAME>_DESC)	Drive description

Table F-1. PC Names (Continued)

PC name	Explanation
(<DRIVE_NAME>_DINH)	Drive switch on inhibit
(<DRIVE_NAME>_DIRD)	Drive ID-run completed
(<DRIVE_NAME>_DLDR)	Drive data logger ready
(<DRIVE_NAME>_DLIM)	Drive limiting
(<DRIVE_NAME>_DLOC)	Point of control drive local active
(<DRIVE_NAME>_DMGN)	Drive magnetized
(<DRIVE_NAME>_DOF2)	No OFF2 (emergency off)
(<DRIVE_NAME>_DOF3)	No OFF3 (emergency stop off)
(<DRIVE_NAME>_DOOW)	Drive out of window
(<DRIVE_NAME>_DRDR)	Drive ready
(<DRIVE_NAME>_DREM)	Drive remote control
(<DRIVE_NAME>_DRON)	Drive ready to switch on
(<DRIVE_NAME>_DRRE)	DRI-R error
(<DRIVE_NAME>_DRRF)	Drive running
(<DRIVE_NAME>_DRRV)	DRI-R valid
(<DRIVE_NAME>_DRSE)	DRI-S error
(<DRIVE_NAME>_DRUD)	Drive run disabled
(<DRIVE_NAME>_DSPE)	Drive actual speed
(<DRIVE_NAME>_DSTA)	Order start drive
(<DRIVE_NAME>_DSTI)	Drive start inhibition
(<DRIVE_NAME>_DSYR)	Drive position counter ready
(<DRIVE_NAME>_DTQ)	Drive torque
(<DRIVE_NAME>_DTQC)	Drive torque controlled
(<DRIVE_NAME>_DTRP)	Drive tripped (fault)
(<DRIVE_NAME>_DVAL)	Drive value
(<DRIVE_NAME>_DZSP)	Drive zero speed
(<DRIVE_NAME>_ESP1)	Input speed ref. in rpm
(<DRIVE_NAME>_ESP2)	Input speed ref. in %
(<DRIVE_NAME>_ESPP)	External speed ref. max. value

Table F-1. PC Names (Continued)

PC name	Explanation
(<DRIVE_NAME>_ETQ)	Input torque ref.
(<DRIVE_NAME>_ETQP)	External torque ref. max. value
(<DRIVE_NAME>_EXTR)	Operator order external reference
(<DRIVE_NAME>_FLT1)	Fault word 1
(<DRIVE_NAME>_FLT2)	Fault word 2
(<DRIVE_NAME>_FLTR)	Fault reset
(<DRIVE_NAME>_GSTA)	Input group start
(<DRIVE_NAME>_GSTO)	Input group stop
(<DRIVE_NAME>_IA)	Input sequence interlock A
(<DRIVE_NAME>_IB1)	Input process interlock B1
(<DRIVE_NAME>_IB2)	Input process interlock B2
(<DRIVE_NAME>_IB3)	Input process interlock B3
(<DRIVE_NAME>_IB4)	Input process interlock B4
(<DRIVE_NAME>_IBF)	Input select start/operation interlock
(<DRIVE_NAME>_IC1)	Input process interlock C1
(<DRIVE_NAME>_INC1)	Input inching 1
(<DRIVE_NAME>_INC2)	Input inching 2
(<DRIVE_NAME>_JOG)	Point of control jog active
(<DRIVE_NAME>_JOGF)	Input jog forward
(<DRIVE_NAME>_JOGR)	Input jog reverse
(<DRIVE_NAME>_LIM1)	Limit word 1
(<DRIVE_NAME>_LIM2)	Limit word 2
(<DRIVE_NAME>_LOC)	Point of control local active
(<DRIVE_NAME>_LSTA)	Input local start
(<DRIVE_NAME>_LSTO)	Input local stop
(<DRIVE_NAME>_MAN)	Point of control central man active
(<DRIVE_NAME>_MAIS)	Main status word
(<DRIVE_NAME>_NOCU)	Nominal current
(<DRIVE_NAME>_NOIL)	No active interlocks

Table F-1. PC Names (Continued)

PC name	Explanation
(<DRIVE_NAME>_NOMS)	Nominal speed
(<DRIVE_NAME>_OAUT)	Operator order auto
(<DRIVE_NAME>_OCEN)	Operator order central
(<DRIVE_NAME>_OFF2)	Input OFF2
(<DRIVE_NAME>_OFF3)	Input OFF3
(<DRIVE_NAME>_OJOG)	Operator order jog
(<DRIVE_NAME>_OLOC)	Operator order local
(<DRIVE_NAME>_OMAN)	Operator order man
(<DRIVE_NAME>_OSER)	Point of control out of service active
(<DRIVE_NAME>_OSTA)	Operator order start
(<DRIVE_NAME>_OSTO)	Operator order stop
(<DRIVE_NAME>_OSTY)	Operator order out of service
(<DRIVE_NAME>_RAHO)	Input ramp hold
(<DRIVE_NAME>_RAIZ)	Input ramp input zero
(<DRIVE_NAME>_RAOZ)	Input ramp output zero
(<DRIVE_NAME>_RCMD)	Input remote command
(<DRIVE_NAME>_RDY)	Drive ready
(<DRIVE_NAME>_REFP)	Order reference in %
(<DRIVE_NAME>_REFR)	Order reference in rpm
(<DRIVE_NAME>_REFS)	Order reference speed
(<DRIVE_NAME>_REFT)	Order reference torque
(<DRIVE_NAME>_SCUR)	Visibility, show current
(<DRIVE_NAME>_SPEM)	Actual speed max. value
(<DRIVE_NAME>_SPER)	Operator order speed setpoint in rpm
(<DRIVE_NAME>_SPIR)	Visibility, show PID reference
(<DRIVE_NAME>_SPPC)	Operator order setpoint in %
(<DRIVE_NAME>_SPPM)	Setpoint max. in %
(<DRIVE_NAME>_SPRM)	Speed setpoint max. in rpm
(<DRIVE_NAME>_SRFM)	Input speed reference mode

Table F-1. PC Names (Continued)

PC name	Explanation
(<DRIVE_NAME>_SSPE)	Visibility, show speed
(<DRIVE_NAME>_SSPP)	Visibility, show speed in %
(<DRIVE_NAME>_SSPR)	Visibility, show speed in rpm
(<DRIVE_NAME>_STQ)	Visibility, show torque
(<DRIVE_NAME>_STQR)	Visibility, show torque reference
(<DRIVE_NAME>_SVAL)	Visibility, show actual value
(<DRIVE_NAME>_TASP)	Terminal actual speed
(<DRIVE_NAME>_TAUT)	Terminal auto
(<DRIVE_NAME>_TCEN)	Terminal central
(<DRIVE_NAME>_TDLO)	Terminal drive local
(<DRIVE_NAME>_TDNR)	Terminal drive address
(<DRIVE_NAME>_TERR)	Terminal error
(<DRIVE_NAME>_TJOG)	Terminal jog
(<DRIVE_NAME>_TLOC)	Terminal local
(<DRIVE_NAME>_TMAN)	Terminal man
(<DRIVE_NAME>_TRDY)	Terminal ready
(<DRIVE_NAME>_TRQM)	Torque max. value
(<DRIVE_NAME>_TRUN)	Terminal running
(<DRIVE_NAME>_TSBY)	Terminal out of service
(<DRIVE_NAME>_VALM)	Value max. value

F.4 Detailed PC Diagram

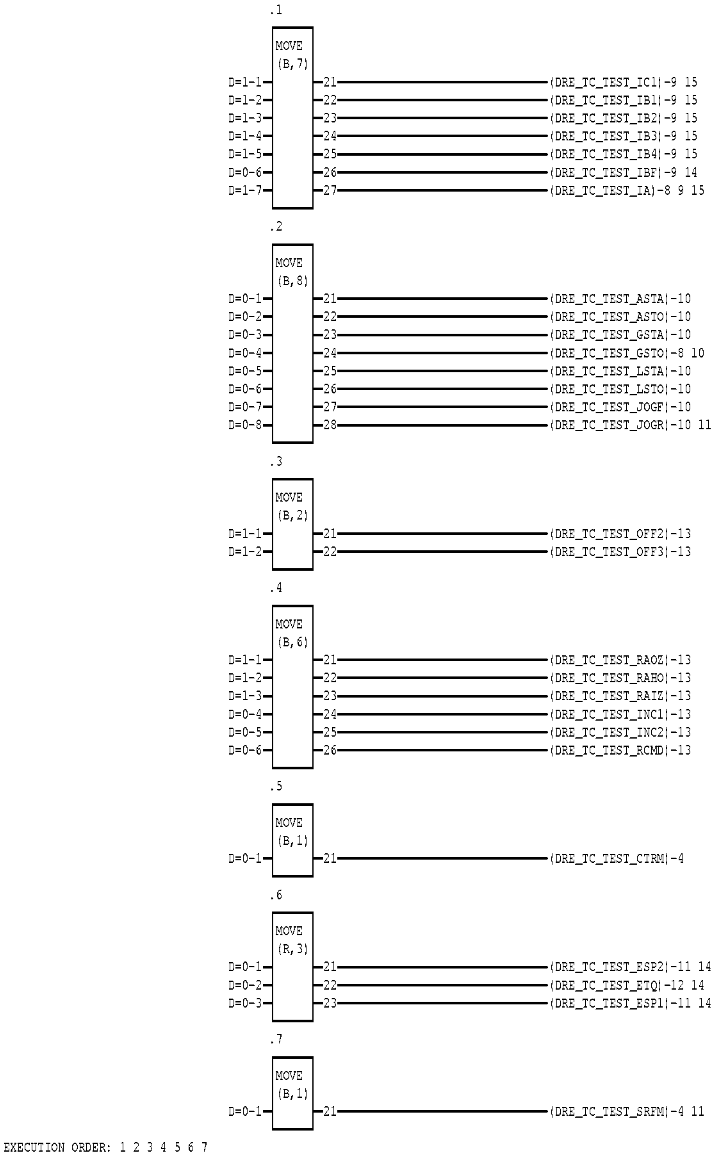


Figure F-2. Sheet 2. Reading Data from Input Terminals

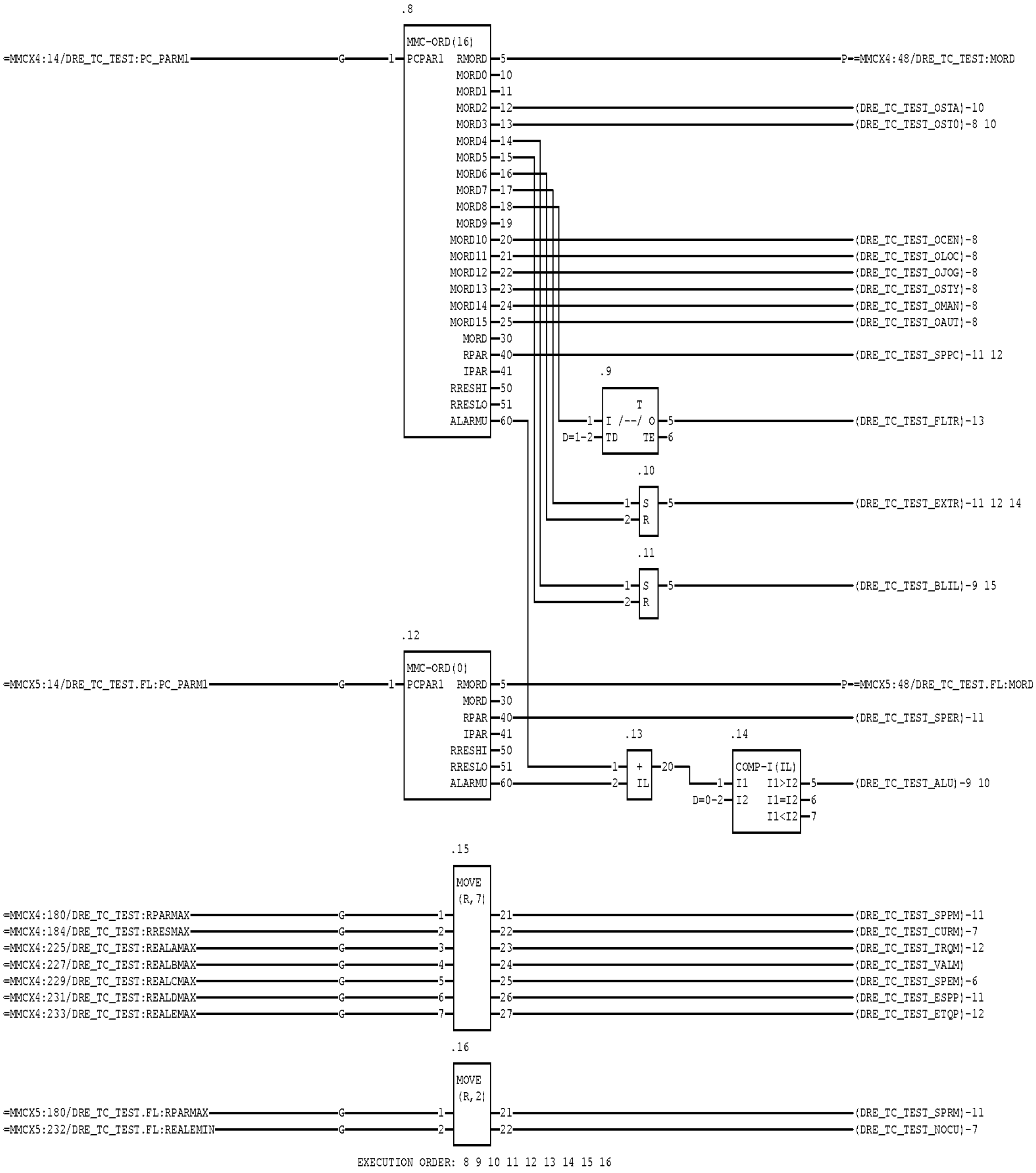

.8
MMC-ORD(16)
=MMCX4:14/DRE_TC_TEST:PC_PARM1
G
1
PCPAR1
RMORD
5
P-=MMCX4:48/DRE_TC_TEST:MORD
MORD0 10
MORD1 11
MORD2 12
(DRE_TC_TEST_OSTA)-10
MORD3 13
(DRE_TC_TEST_OST0)-8 10
MORD4 14
MORD5 15
MORD6 16
MORD7 17
MORD8 18
MORD9 19
MORD10 20
(DRE_TC_TEST_OCEN)-8
MORD11 21
(DRE_TC_TEST_OLOC)-8
MORD12 22
(DRE_TC_TEST_OJOG)-8
MORD13 23
(DRE_TC_TEST_OSTY)-8
MORD14 24
(DRE_TC_TEST_OMAN)-8
MORD15 25
(DRE_TC_TEST_OAUT)-8
MORD 30
RPAR 40
(DRE_TC_TEST_SPPC)-11 12
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.9
T
1
I /--/ O
5
(DRE_TC_TEST_FLTR)-13
D=1-2
TD
TE
6
.10
1 S
2 R
5
(DRE_TC_TEST_EXTR)-11 12 14
.11
1 S
2 R
5
(DRE_TC_TEST_BLIL)-9 15
.12
MMC-ORD(0)
=MMCX5:14/DRE_TC_TEST.FL:PC_PARM1
G
1
PCPAR1
RMORD
5
P-=MMCX5:48/DRE_TC_TEST.FL:MORD
MORD 30
RPAR 40
(DRE_TC_TEST_SPER)-11
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.13
1 +
2 IL
20
.14
COMP-I(IL)
1 I1
I1>I2 5
(DRE_TC_TEST_ALU)-9 10
D=0-2 I2
I1=I2 6
I1<I2 7
.15
MOVE
(R,7)
=MMCX4:180/DRE_TC_TEST:RPARMAX G 1 21 (DRE_TC_TEST_SPPM)-11
=MMCX4:184/DRE_TC_TEST:RRESMAX G 2 22 (DRE_TC_TEST_CURM)-7
=MMCX4:225/DRE_TC_TEST:REALAMAX G 3 23 (DRE_TC_TEST_TRQM)-12
=MMCX4:227/DRE_TC_TEST:REALBMAX G 4 24 (DRE_TC_TEST_VALM)
=MMCX4:229/DRE_TC_TEST:REALCMAX G 5 25 (DRE_TC_TEST_SPEM)-6
=MMCX4:231/DRE_TC_TEST:REALDMAX G 6 26 (DRE_TC_TEST_ESPP)-11
=MMCX4:233/DRE_TC_TEST:REALEMAX G 7 27 (DRE_TC_TEST_ETQP)-12
.16
MOVE
(R,2)
=MMCX5:180/DRE_TC_TEST.FL:RPARMAX G 1 21 (DRE_TC_TEST_SPRM)-11
=MMCX5:232/DRE_TC_TEST.FL:REALEMIN G 2 22 (DRE_TC_TEST_NOCU)-7
EXECUTION ORDER: 8 9 10 11 12 13 14 15 16

Figure F-3. Sheet 3. Reading from Dialogs

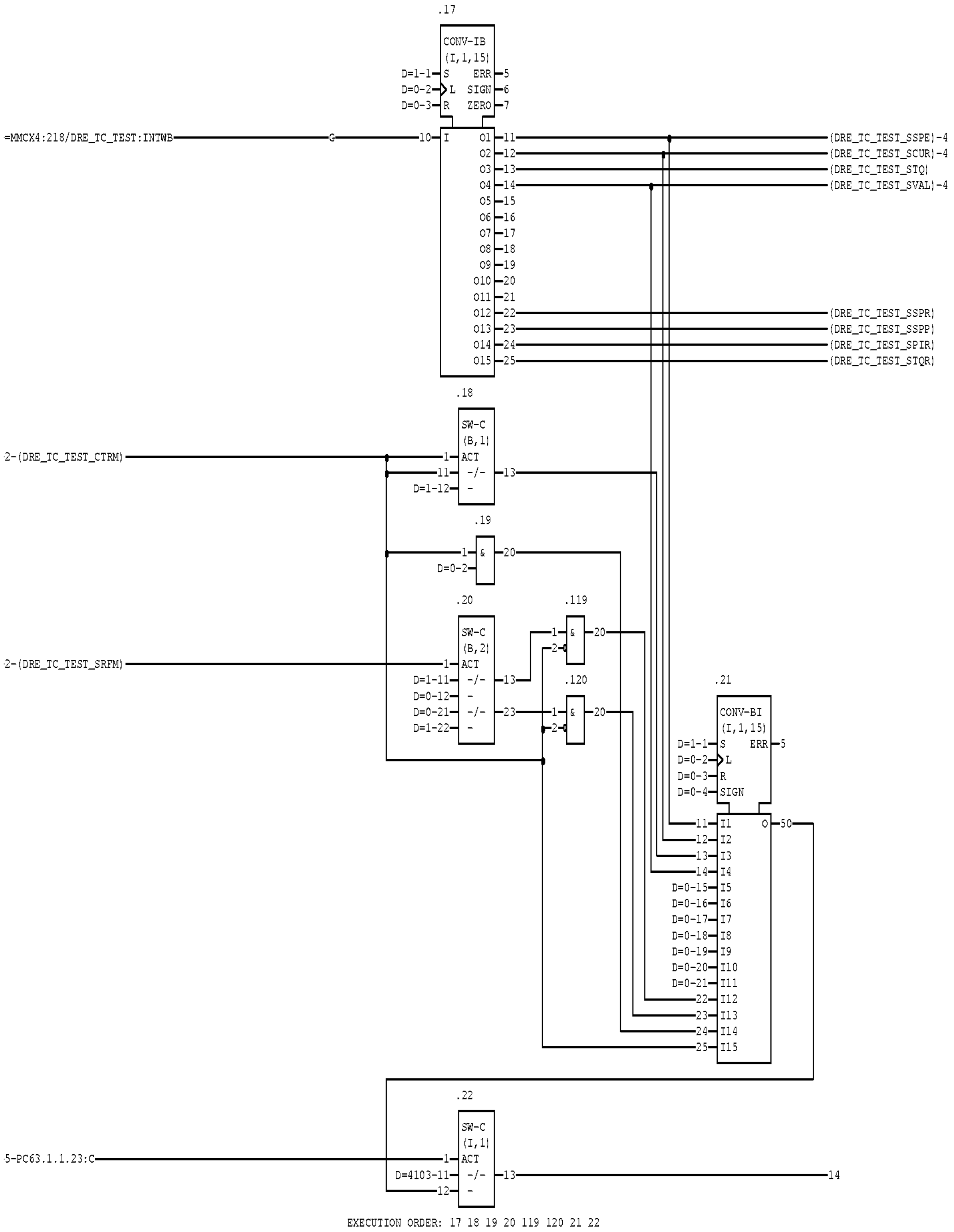


Figure F-4. Sheet 4. VisibilityControl

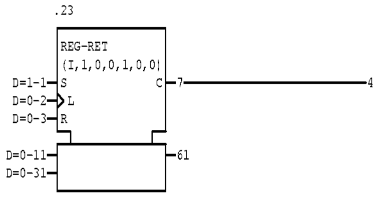


Figure F-5. Sheet 5. Visibility Control

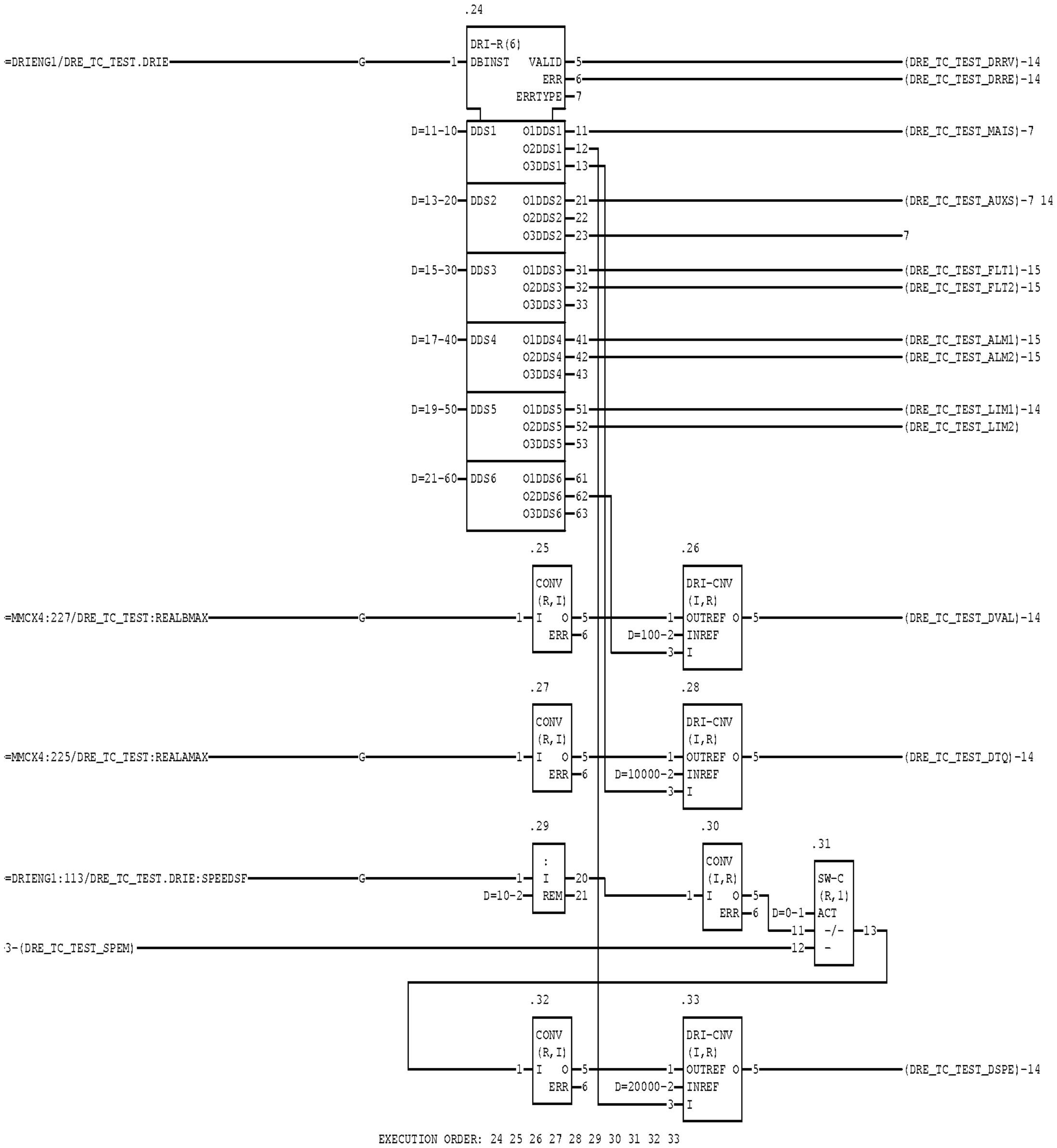


Figure F-6. Sheet 6. Reading from Drive Unit

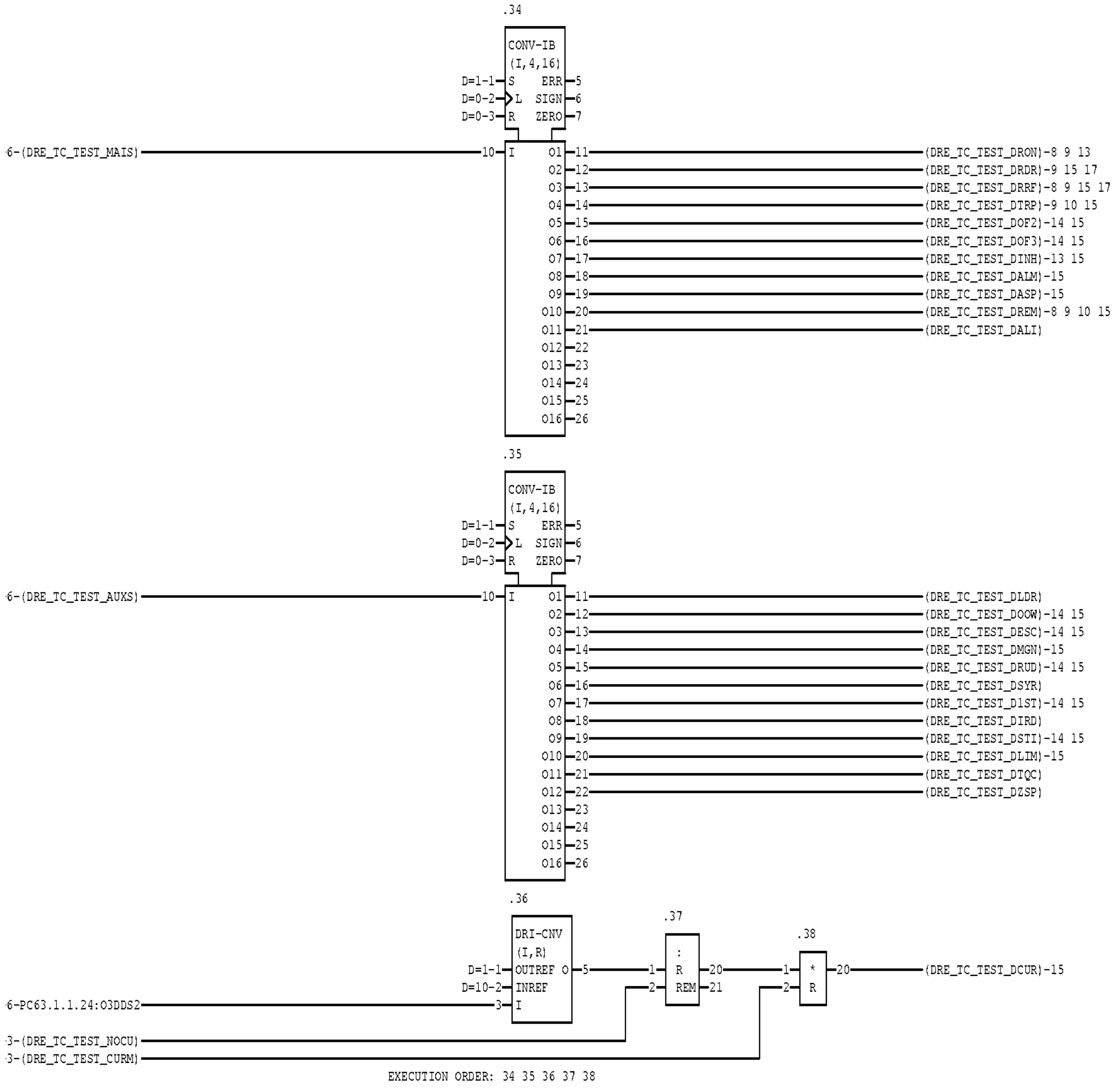

.34
CONV-IB
(I,4,16)
D=1-1 S
D=0-2 L
D=0-3 R
ERR 5
SIGN 6
ZERO 7
6-(DRE_TC_TEST_MAIS)
10 I
O1 11 (DRE_TC_TEST_DRON)-8 9 13
O2 12 (DRE_TC_TEST_DRDR)-9 15 17
O3 13 (DRE_TC_TEST_DRRF)-8 9 15 17
O4 14 (DRE_TC_TEST_DTRP)-9 10 15
O5 15 (DRE_TC_TEST_DOF2)-14 15
O6 16 (DRE_TC_TEST_DOF3)-14 15
O7 17 (DRE_TC_TEST_DINH)-13 15
O8 18 (DRE_TC_TEST_DALM)-15
O9 19 (DRE_TC_TEST_DASP)-15
O10 20 (DRE_TC_TEST_DREM)-8 9 10 15
O11 21 (DRE_TC_TEST_DALI)
O12 22
O13 23
O14 24
O15 25
O16 26
.35
CONV-IB
(I,4,16)
D=1-1 S
D=0-2 L
D=0-3 R
ERR 5
SIGN 6
ZERO 7
6-(DRE_TC_TEST_AUXS)
10 I
O1 11 (DRE_TC_TEST_DLDR)
O2 12 (DRE_TC_TEST_DOOW)-14 15
O3 13 (DRE_TC_TEST_DESC)-14 15
O4 14 (DRE_TC_TEST_DMGN)-15
O5 15 (DRE_TC_TEST_DRUD)-14 15
O6 16 (DRE_TC_TEST_DSYR)
O7 17 (DRE_TC_TEST_D1ST)-14 15
O8 18 (DRE_TC_TEST_DIRD)
O9 19 (DRE_TC_TEST_DSTI)-14 15
O10 20 (DRE_TC_TEST_DLIM)-15
O11 21 (DRE_TC_TEST_DTQC)
O12 22 (DRE_TC_TEST_DZSP)
O13 23
O14 24
O15 25
O16 26
.36
DRI-CNV
(I,R)
D=1-1 OUTREF
D=10-2 INREF
3 I
O 5
6-PC63.1.1.24:O3DDS2
.37
:
1 R 20
2 REM 21
.38
1 * 20
2 R
(DRE_TC_TEST_DCUR)-15
3-(DRE_TC_TEST_NOCU)
3-(DRE_TC_TEST_CURM)
EXECUTION ORDER: 34 35 36 37 38

Figure F-7. Sheet 7. Reading from Drive Unit

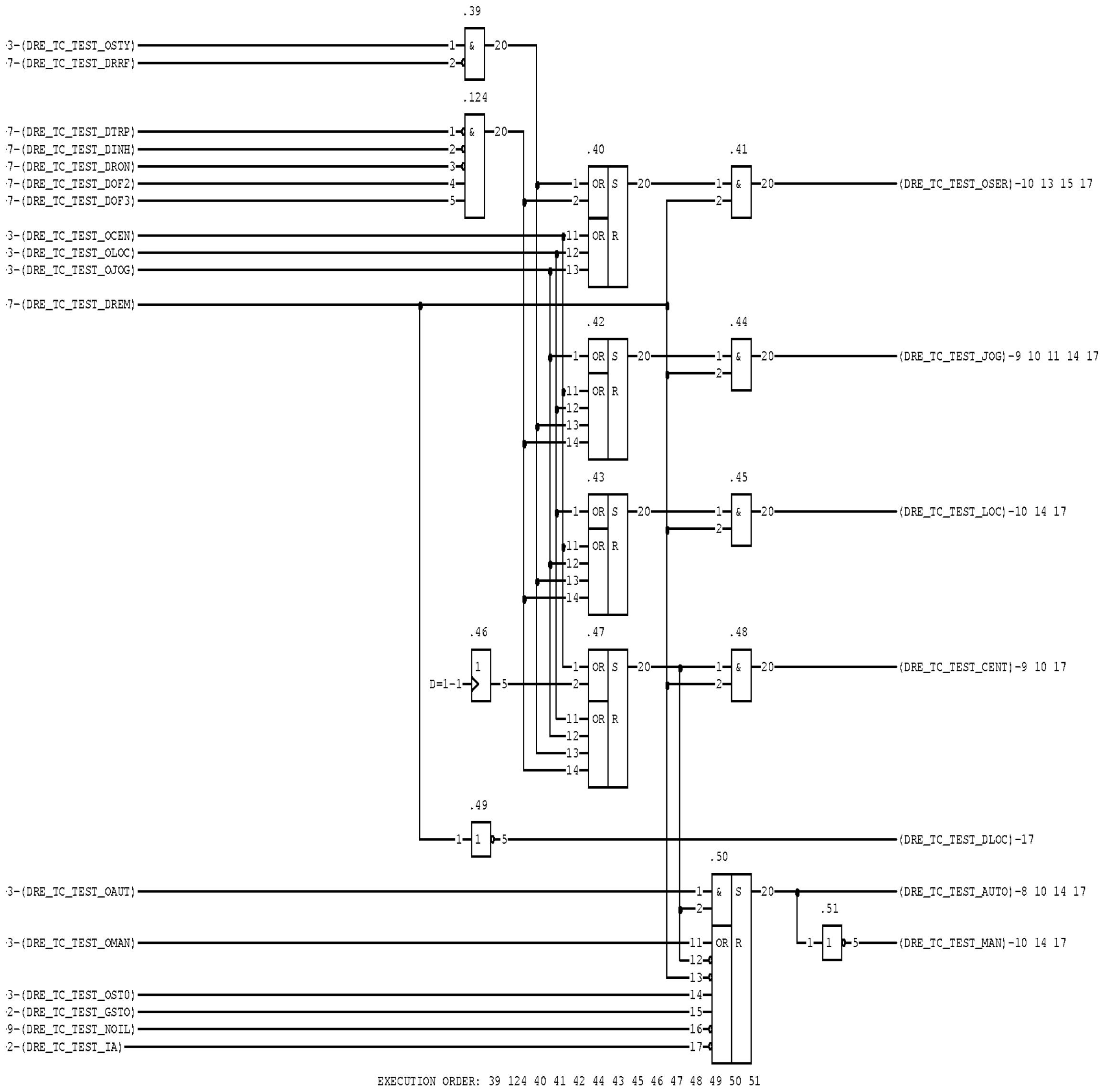


Figure F-8. Sheet 8. Point of Control

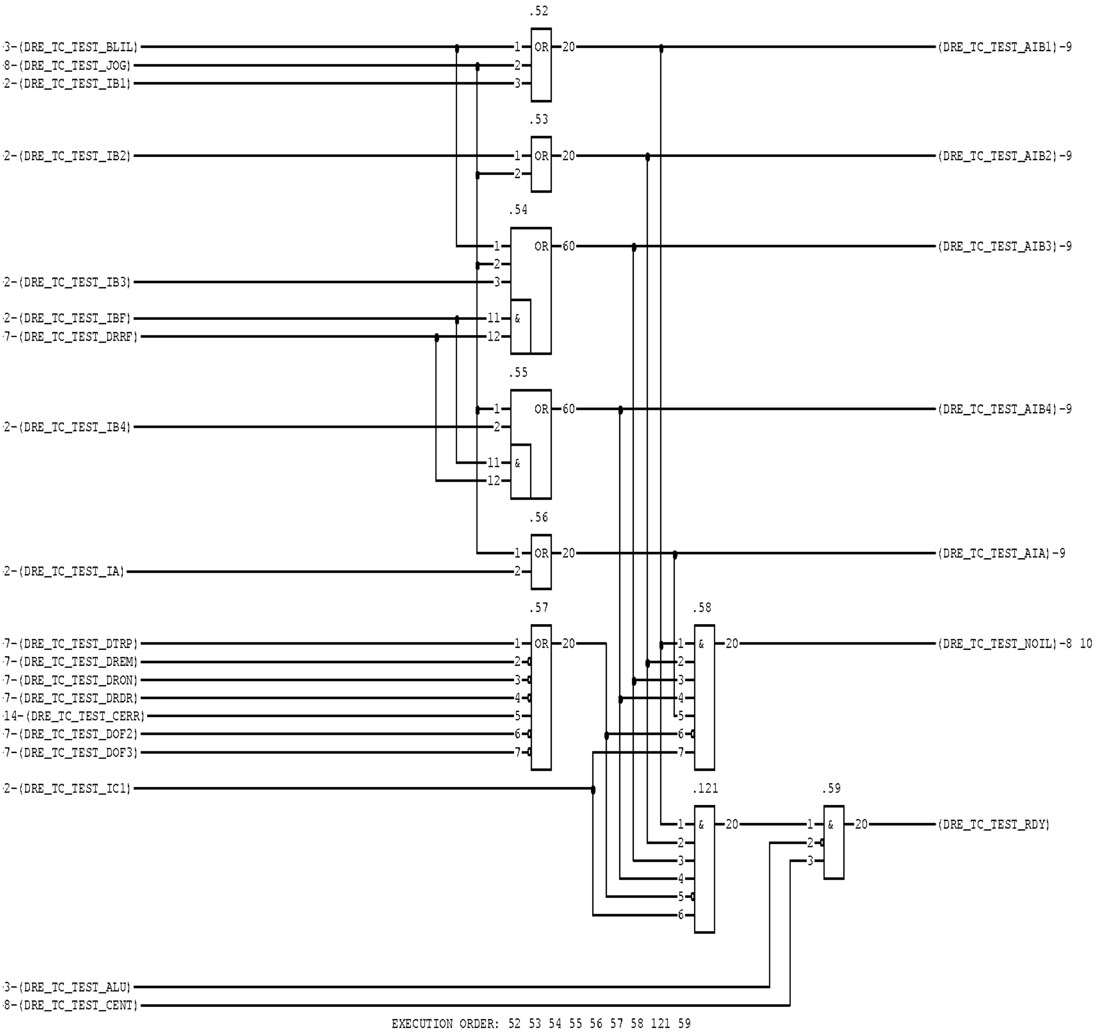


Figure F-9. Sheet 9. Interlocks

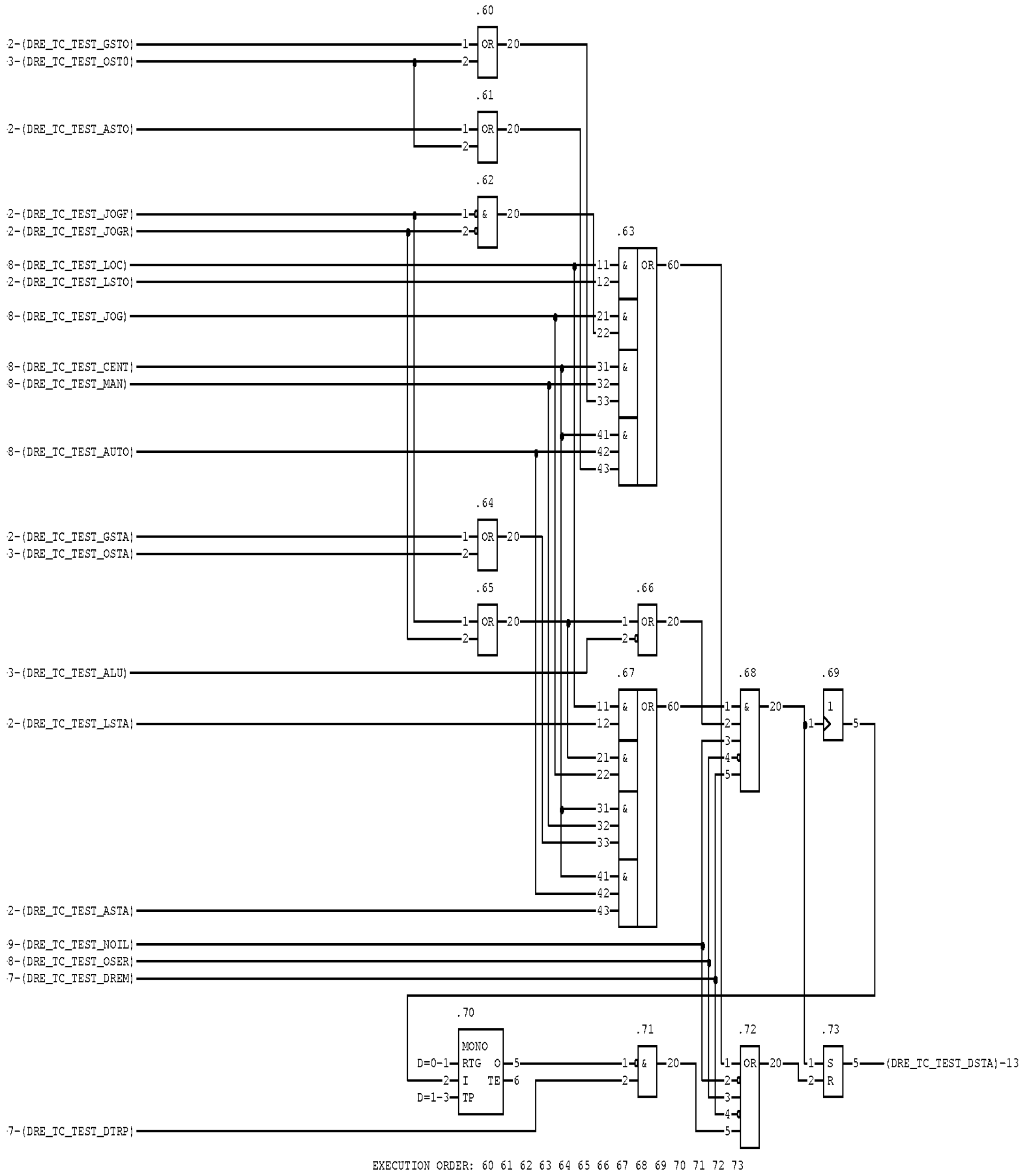


Figure F-10. Sheet 10. Start/Stop

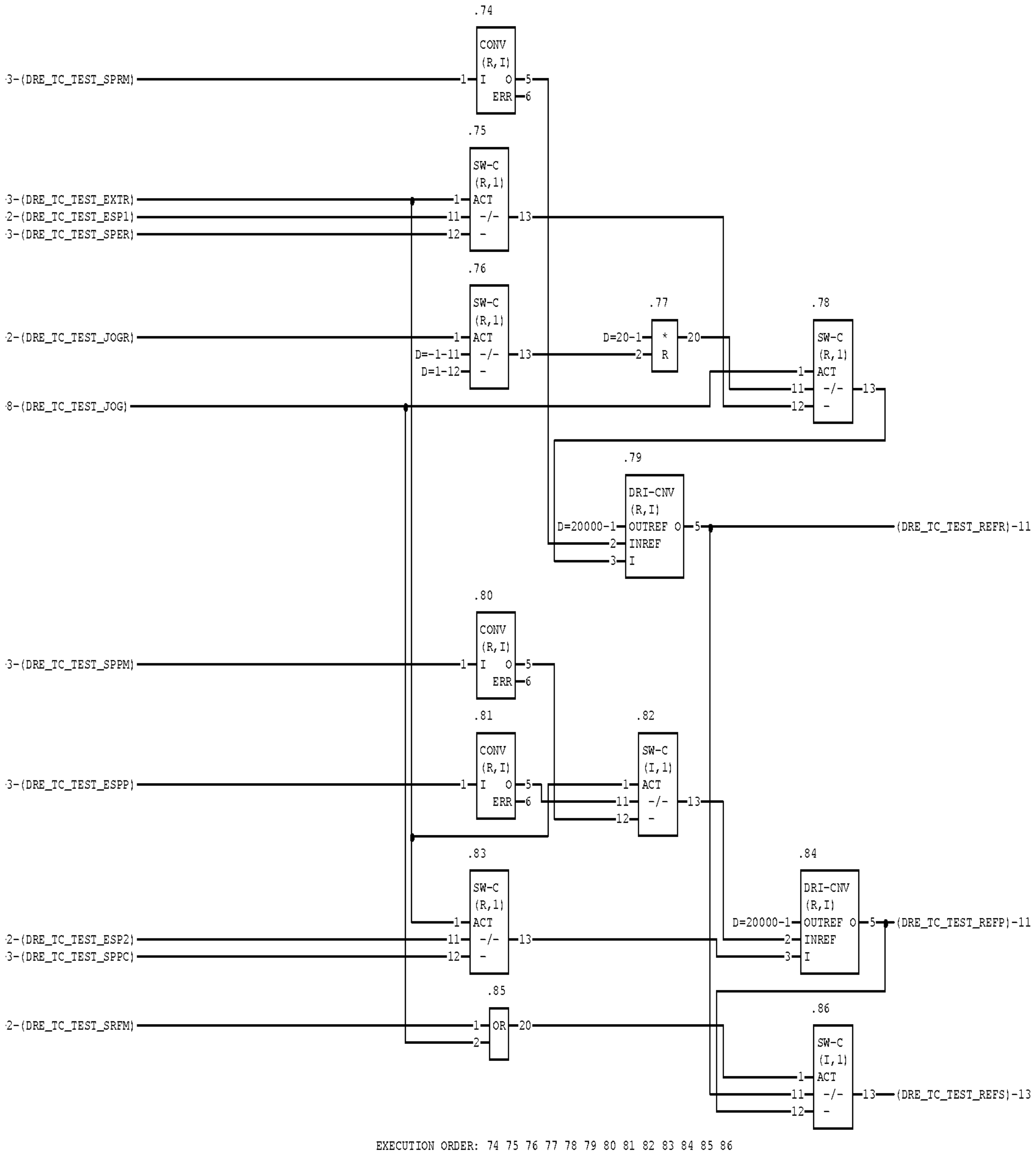


Figure F-11. Sheet 11. Sending to Drive Unit

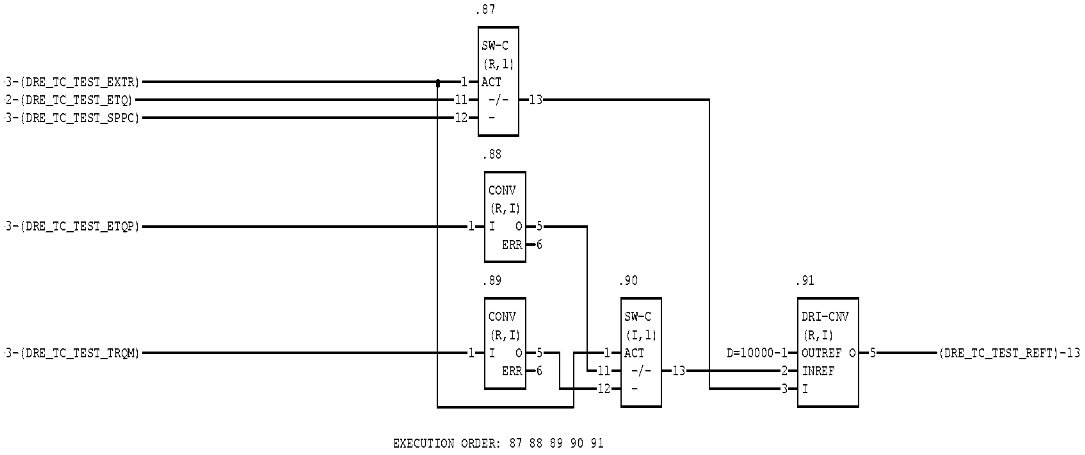


Figure F-12. Sheet 12. Sending to Drive Uni

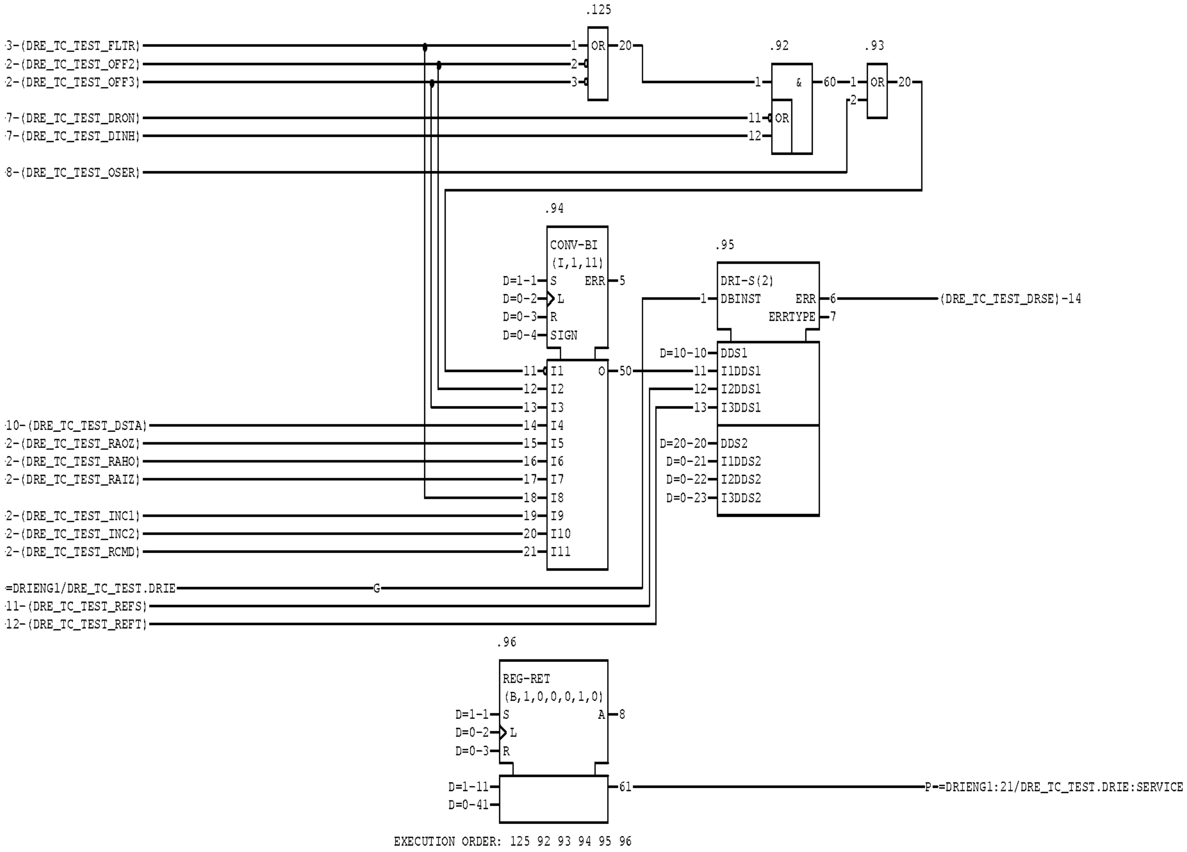


Figure F-13. Sheet 13. Sending to Drive Unit

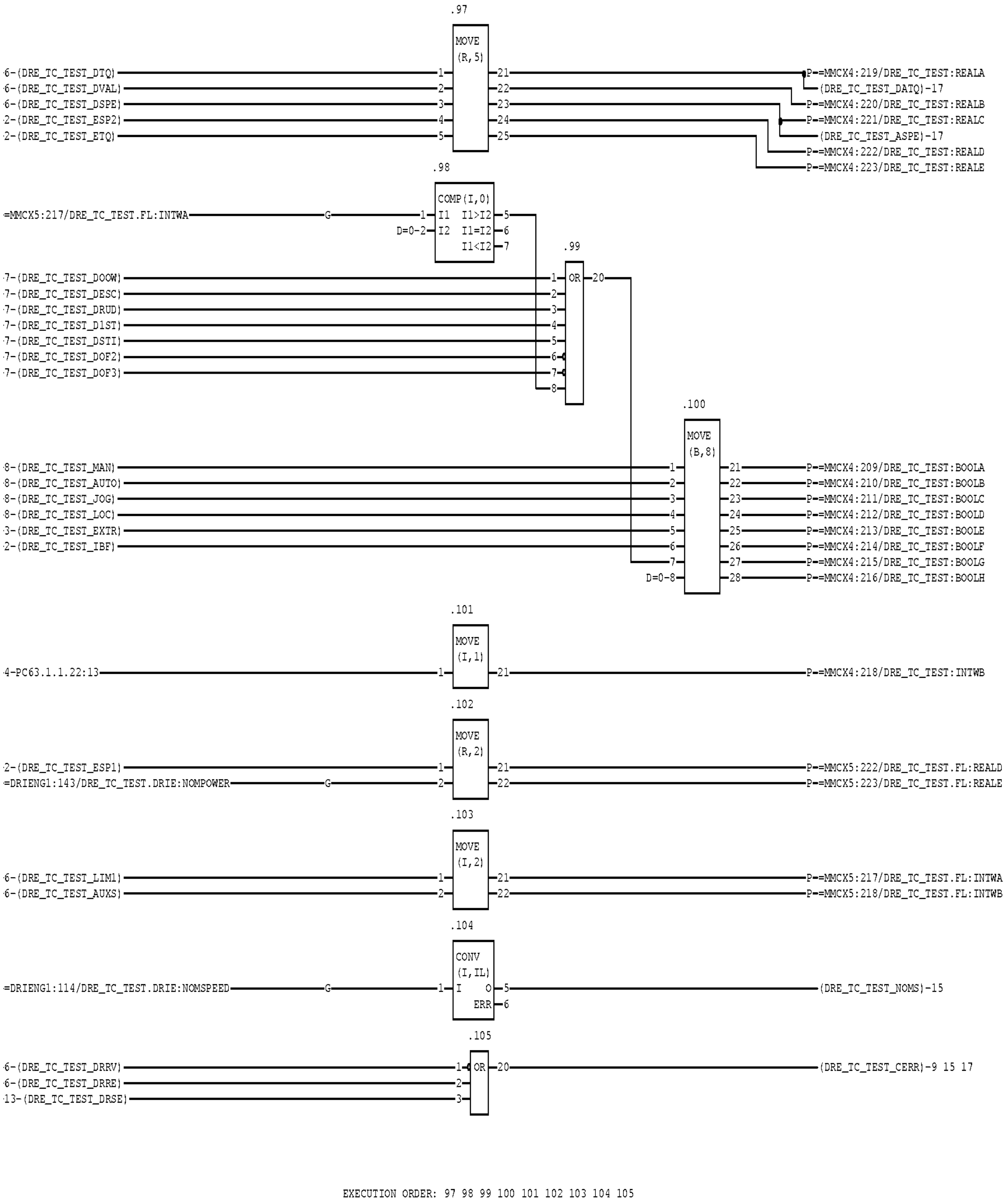


Figure F-14. Sheet 14. Storing Data for Presentation

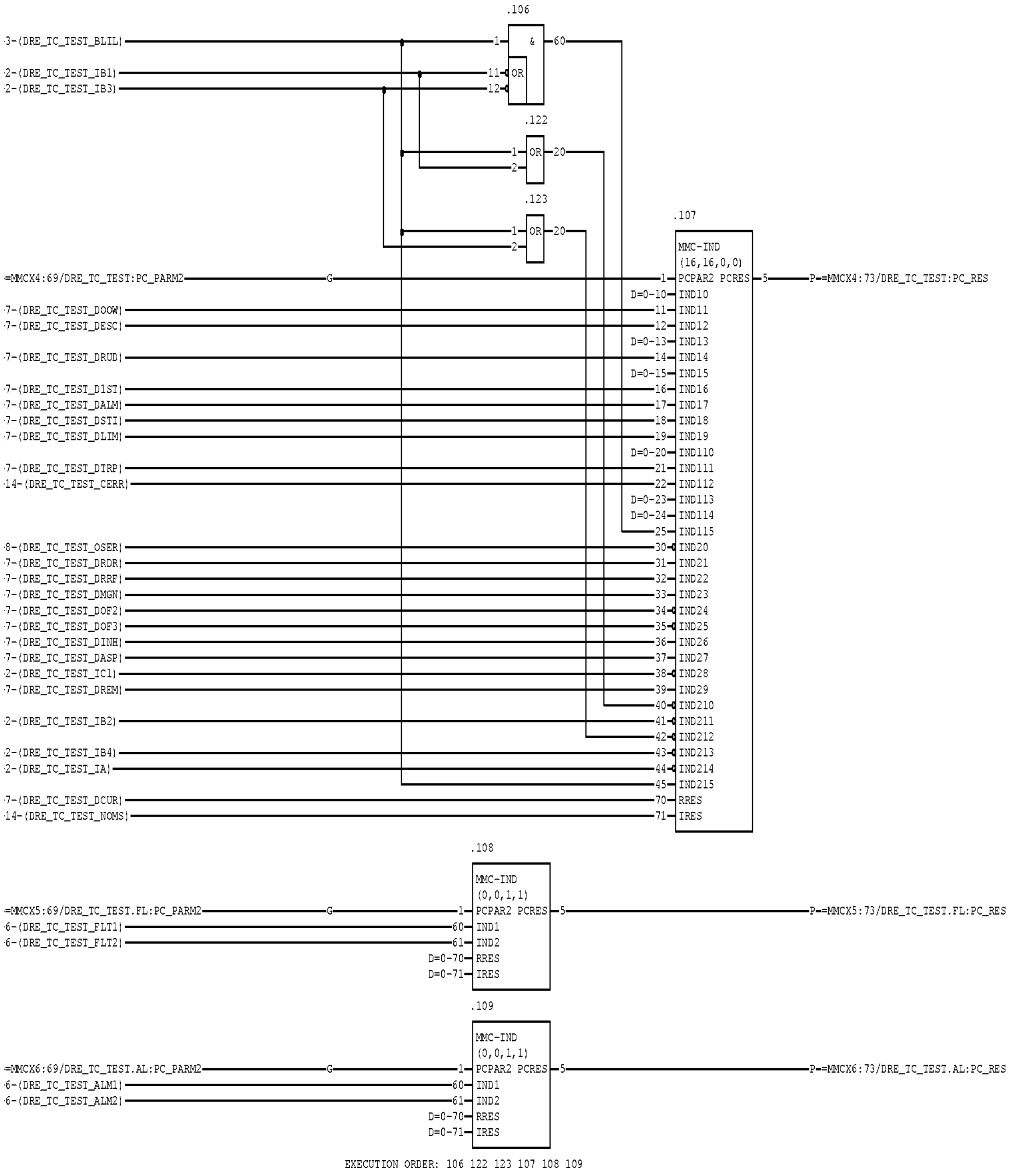


Figure F-15. Sheet 15. Storing Data for Presentation

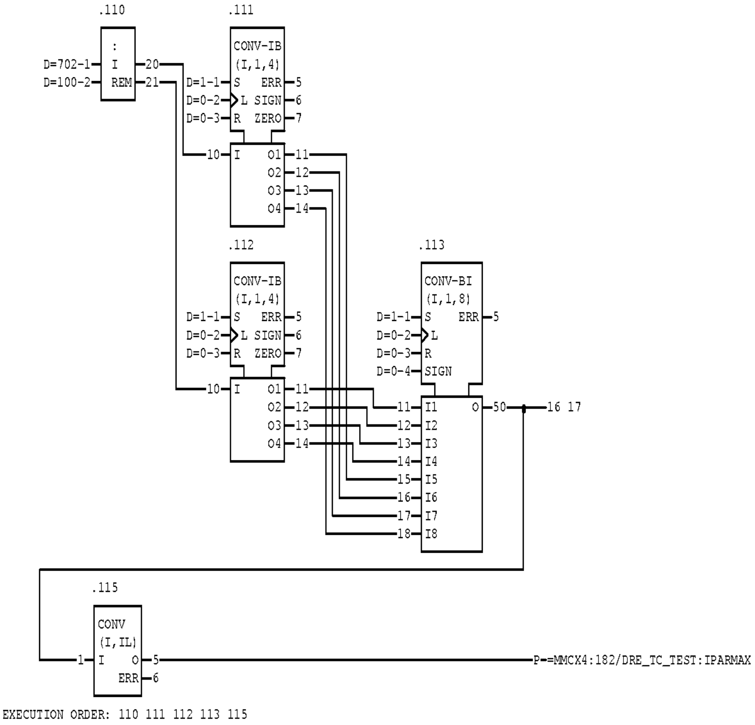


Figure F-16. Sheet 16. Storing Data on Output Terminals

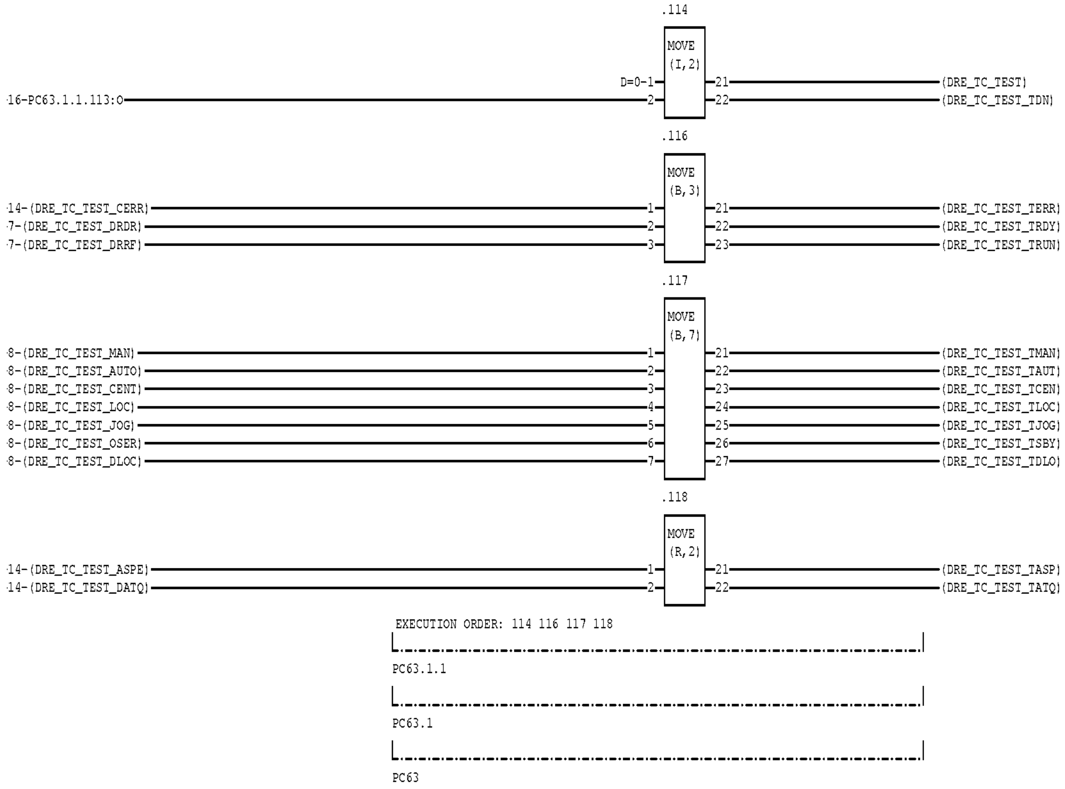


Figure F-17. Sheet 17. Storing Data on Output Terminals

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